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A CASE OF SENSORY APHASIA—WORD-BLINDNESS WITH HEMIANOPSIA.

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This case illustrates the following points: (1) The association of word-blindness with disease in the parieto-temporal region; (2) The paraphasia which so often accompanies this condition; (3) The occurrence of hemianopsia from interruption of the fibres of the optic radiation, without disease of the occipital lobe.

Clinical Summary.—*Inability to read a newspaper the first symptom; typical word-blindness, retention of intelligent hearing; misplacing of words and sentences—paraphasia; right homonymous hemianopsia; no paralysis; persistence of this condition for over two months, with gradual loss of muscular strength and mental power. For thirty-six hours before death, paralysis of right arm and leg.*

Anatomical Summary.—*Necrotic softening in the left hemisphere of the supra-marginal and lower part of angular gyri, of the posterior part of the first and second temporal, and of the two annectant convolutions uniting the first temporal to the parietal lobe. Complete transverse softening of the white matter between these convolutions externally and the lateral ventricle. The gray and white matter of the occipital lobe uninvolved.*

John W., aged seventy-two years, Scotchman, bookkeeper, applied at the Philadelphia Infirmary for Diseases of the Nervous System, November 14, 1888, complaining of uneasy sensations in his head. He was a healthy, vigorous-looking man, perfectly intelligent, and spoke well and clearly. It was not thought at first that there was anything the matter

with him, beyond slight headache; but it was noticed that he had occasional difficulty in getting the word he wished, and this circumstance led to a more careful examination. He says he has been a temperate man, and has always enjoyed excellent health. He has not had syphilis. For some time past he has not felt as well as usual. On November 1st, while at his supper, in a restaurant, he found that he could not read the daily paper. He was sure that this came on quickly, and had been his chief annoyance, as he was an ardent politician. He had no definite headache, but complained of a diffuse, uneasy sensation, and sometimes placed his hand upon his head saying, "It is all wrong here."

Present condition: Vigorous-looking man for his age; face intelligent; speaks clearly and rapidly, with occasional interruptions; no paralysis; movements of the arms, legs, and face perfect; no loss of sensation on either side; no incoördination; he stands well with his eyes shut; reflexes normal.

Speech: Though he speaks clearly and intelligently, and utters some sentences without interruption, replying promptly and fluently to questions, and evidently understanding everything, there is very distinct speech-disturbance; thus, for some time he could not give the address of his residence. He says he knows where it is, but could not pronounce it. He told the first name of the man with whom he lived, but could not say the second. He could not name his own occupation, but said, "Keep, keep, keep. Oh, you say it for me." When told—bookkeeper—he repeated it distinctly. He occasionally misplaces words. In referring to a wetting which he had spoken of, he said, "Deliberate attacks of wet dress." When a printed or written page is presented to him he does not appear to comprehend the words. The word Philadelphia at the head of a hospital blank, he read P, r, i, n, g, r, e. k. When told that it was Philadelphia, he replied, "Oh, certainly it is, I've known it for sixty-five years." His age, 72, written on a slip of paper, he read 213. He did not recognize the words "Cleveland and Harrison" at the top of a newspaper column, but when read to him, said, "I know all about them," and began making some very shrewd observations. He can write his name, but says that since his failure to see he does so with difficulty. He writes as well with his eyes shut as when they are open, but does so with hesitation. He wrote the name of the hospital, and the words "Philadelphia Record." He could not read the words of his name after he had written them. He names objects held before him quite readily.

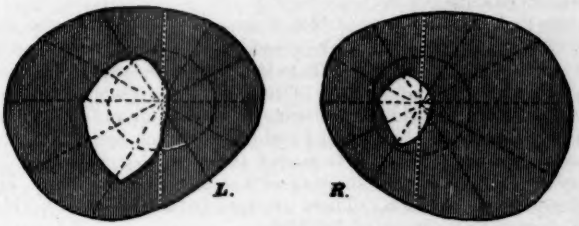
Dr. de Schweinitz examined the eyes, and reported the presence of right lateral homonymous hemianopsia. Dr. de Schweinitz's report is here annexed:

Right eye: An oval optic disk, with the scleral ring plainly followed all round, and both superficial and deep layers very gray; the veins full and dark, the arteries unchanged in size; a fine retinal haze veiled the upper and lower margins of the disk; there were no splotches or hæmorrhages in the general eye-ground, and no changes in the macular region.

Left eye: An oval optic disk, with well-marked scleral ring, more visible than on the opposite side, because the retinal haze seen in the opposite eye was less apparent. A similar appearance of the retinal circulation and an absence of gross changes in the retina and choroid;

the disk was also gray, but not so devoid of color and capillarity as that upon the opposite side.

Fig. 1.



The oval outline of each figure is the average normal field of vision; the shading represents the blind areas. The asterisk is the fixing-point which is not exactly bisected by the line of division, but this passes a little to the right, although touching the fixing-point. There is decided contraction of the left half of each field, most marked upon the right side; that is, upon the side opposite to the lesion. The fields were taken with a one-centimetre square of white, pasted upon a dead black surface.

November 21, 1888. Patient was admitted to hospital with no essential change in his condition, though he did not seem to misplace words so often. He could not say his age. 72, but said "60 and 10 above that and 2 above that—that's 72." He knew the day of the week and of the month, and what year it was. He was asked how many years after Burns's death he was born, and said 5000, but at once corrected himself and said "No, no; I do not mean that—twenty-five." The state of word-blindness persisted. He was given a newspaper, the Philadelphia *Record*, and asked to read its title. He said "Christian Observer." It was difficult to get him to write, and it was impossible for him to do so from dictation for any lengthy sentence. He wrote the word "Record" when told to, but after he had written it he spelled it "Freedom."

For the first two weeks in hospital there was no special change. He seemed to speak with rather fewer errors. He kept very quiet, and did not care to talk with the other patients. When asked how he felt, he generally placed his hand upon his head and repeated several times the phrase "All wrong here."

December 6. For several days he has vomited frequently.

8*th*. The following note was made: "Talks less freely. Speaks intelligently and plainly at first, but after a few minutes it is difficult to understand what he states. No additional ocular changes. The grip in the hands is equal. He walks with a somewhat tottering gait, though there is no actual paralysis."

For the next three weeks the condition remained practically unchanged. Early in January he became distinctly weaker.

On the 4th the following note was made: "Patient has been in bed for several days; no paralysis of motion or of sensation. He seems to understand and usually answers correctly, though, as was frequently noted, he would not give his age correctly, saying any figures. When first spoken to, his speech is clear and distinct, and then in a few minutes becomes very incoherent and mumbling. Lately he has been very noisy and restless at night, getting out of bed and walking about the ward."

On the 12th the note was: "Remains in the same condition; no fever; no paralysis; talks without difficulty; answers some questions correctly, others in a senseless manner. Says continually 'Lord, have mercy.' No disturbance of sensation."

On the 15th the note was: "Has been very wakeful for the past two days. This morning could not be roused. He lies with his head turned to the left, but sometimes moves it to the right. No conjugate deviation of the eyes. Pupils equal and of medium size; react feebly to light. Muscles of the right side of face seem to act as well as those on the left. There is complete paralysis of the right arm, which has come on within the last twenty-four hours. He moves the right leg, but when lifted it falls more rapidly and with more dead weight than the other. He is in a semi-comatose condition. There are loud bronchial râles." He sank and died on the afternoon of the 16th.

Post-mortem, five hours after death: Body moderately well-nourished; no rigor mortis; calvaria thick and symmetrical.

Dura was normal and very closely adherent to the skull; sinuses contained recent blood-clots; a moderate amount of fluid escaped on removal of the brain. At the base the membranes were normal. The carotids were stiff and atheromatous; vertebral and basilar arteries in the same state. Nerves at the base normal.

Cortex: Pia moderately injected; the posterior part of the left hemisphere looked fuller and the convolutions were paler than on the right side. This was particularly marked on the parietal and temporal lobes, portions of which look softened. More accurately determined by sight and touch, the superficial soft areas were as follows:

1. The entire supra-marginal and the lower part of the angular gyri.
2. The posterior part of the first and second temporal gyri, which bulge distinctly, and the veins of which are much distended.
3. The two annectant convolutions joining the first temporal gyrus and the parietal convolutions, only evident after separation of the fissure of Sylvius.

Though these parts were softened and contrasted by touch, in a marked manner, with the rest of the brain, superficially they did not look very different, and were only a little paler in color.

The cortical arteries were stiff, and when slit open were found free to the finer ramifications. They presented occasional flakes of atheroma and recent soft blood-clots, but no thrombi. The posterior cerebrals presented several atheromatous patches. The branches passing to the cuneus were free. The lateral ventricle was not distended on the left side. The caudate nuclei and thalami looked normal. On the outer wall of the left ventricle, just at the point of divergence of the descending and posterior cornua, there was a grayish-white swelling, presenting congested bloodvessels here and there, and which looked like a region of thrombotic necrosis; behind, it extended into the posterior horn, anteriorly it did not reach the pulvinar. The ependyma of the posterior horn was soft, but the deeper white matter of the lingual gyrus and of the convolution at the junction of the parieto-occipital and calcarine fissures was not involved to any depth.

The organ was injected with and hardened in Müller's fluid, and then horizontal sections were made.

Section 1, half an inch above the corpus callosum.

The white matter of the centrum ovale on the left side presented a slight reddish-brown color in the fibres of the parietal lobe.

Section 2, at level of the corpus callosum.

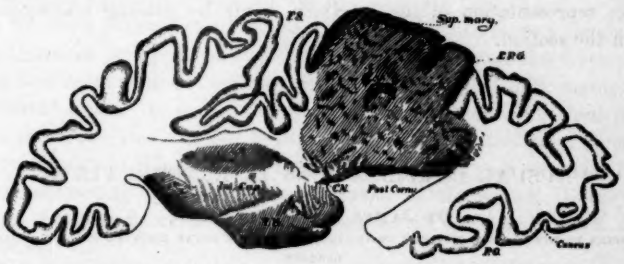
An area of softening in the posterior-external part of the centrum ovale of about four centimetres in antero-posterior extent. Externally, this section passed through the angular gyrus, the gray matter of which was firm, but the white matter was uniformly softened.

Section 3, at the level of the middle of the basal ganglia.

The softening occupied a large area between the posterior horn and the middle of the outer aspect of the hemisphere, involving the entire white matter of this region (see figure). Anteriorly it reached to the posterior part of the internal capsule, which appeared somewhat softened but not changed in color. Posteriorly, the softening did not extend behind a line drawn across the level of the parieto-occipital fissure. The white matter of the occipital lobe was firm, and the gray matter of the cuneus was uninvolved.

Section 4, passing through the outer third of the left crus.

FIG. 2.



Transverse section of left hemisphere passing through supra-marginal convolution, showing the area of softening. F. S., fissure of Sylvius; L. N., lenticular nucleus: C. N, caudate nucleus; C. N., tail of caudate nucleus: Int. Cap., internal capsule; T. H., optic thalamus; P. O., parieto-occipital fissure; E. P. O., an external parieto-occipital fissure (?); Sup. Marg., supra-marginal gyrus.

The softening is more extensive. It reached nearly seven centimetres in the antero-posterior direction, extending anteriorly, and just involving the fibres behind the end of the lenticular nucleus and the tail of the caudate nucleus, where it passed into the descending cornu. Posteriorly, the white fibres of the occipital lobe were not involved. Internally, the softening reached to the ependyma of the posterior horn, which was dark in color. Externally, it touched, but did not involve the gray matter of the convolutions.

The internal capsule, the lenticular nucleus, the thalamus, and the crus seemed normal.

Section 5, at the level of the upper margin of the uncinate convolution.

Large area of softening, two inches in thickness and one in breadth. in the temporo-sphenoidal lobe, reaching to within two inches of its apex. Externally, it touched the gray matter of the third and the base of the second temporal gyri.

The corresponding sections of the other hemisphere were normal.

The softened area has a grayish-yellow appearance, interspersed with patches of extravasation. It appeared to be ordinary necrotic change. The vessels were carefully withdrawn; no miliary aneurisms were found, but many of the smaller ones were blocked with thrombi. At the lower part of the temporo-sphenoidal lobe the margin of softened area was unusually firm. The branches of the posterior cerebral artery were free.

The drawing was made from a section which passed through the lower portion of the supra-marginal gyrus, at half an inch from the termination of the Sylvian fissure. The softening here was more superficial than at any other point, and seemed to involve the gray matter. In the posterior part of the first and second temporal the softening reached to the gray matter, but did not enter it. In the section from which the drawing was taken a deep fissure is seen, which crossed the hemisphere, and seemed to separate the parietal and occipital lobes. The angular gyrus lies at a higher level than shown in the section; the white matter of it was softened, but the gray looked very natural. The drawing is an exact representation of the specimen, made by placing tracing-paper upon the section.

UNUSUAL COMPLICATIONS IN ENTERIC FEVER.

By James Finlayson, M.D.,
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I.

Abortive Attacks, occurring in Fever Epidemics, not free from Danger.

In outbreaks of infectious disease in institutions, or otherwise affecting special groups of people, it is not uncommon to find a certain number of abortive attacks, or of obscure and indefinite illnesses, the nature of which can only be recognized in view of the circumstances under which they occur. In the unfortunate outbreak of enteric fever amongst the nurses, servants, and patients of the Glasgow Western Infirmary which occurred in August, 1884, the infection was traced with complete precision to contaminated milk. (See *Report by the Medical Officer on Outbreak of Enteric Fever in Royal and Western Infirmaries, and Fever Hospital, Belvidere, Glasgow, in August*, 1884: Glasgow, 1884.) In this outbreak we had various illustrations of these abortive attacks—slight febrile attacks for two or three days, with complete recovery. Unfortunately, however, we had one case, apparently the most trivial of the whole group, which subsequently proved fatal. This girl, a housemaid,

had been, like many others, feeling poorly for nearly a week, with slight shiverings and squeamishness, but she was at work up till September 4th; next day she was put under my care, when her temperature was found to be 102.2° F. Her menses came on next day, her temperature fell to the normal and remained so. She was, however, kept under observation, but was allowed up on the 9th, as she seemed quite well; the temperature was taken regularly till September 14th, and was always normal. She still, however, was kept in the ward, although not regarded as a patient; but on the 20th and 21st she felt ill, with headache and sickness, and her temperature on the 21st, at night, was 103°. The case proved a bad one from the beginning, going on with persistently high fever till death on October 18th. We had here, as I take it, a fatal relapse, proving the first trivial illness to have been due to veritable enteric fever, although in the absence of any such relapse one could hardly have regarded, as more than an abortive febricula, a febrile attack which subsided completely the day after she took to bed.

In the fever patients under my care in this epidemic, there were many recrudescences and relapses; probably the way in which the fever was contracted accounted for different doses of the poisoned milk maturing at different times. In one of the other patients, a relapse occurred just at the same time that this girl began with her second and fatal illness. The peculiarity in this case was the extremely short and slight initial illness, contrasting with the obvious gravity of the second illness or relapse, if it may be called so, which declared its seriousness from the beginning.

II.

Obscure Illness, with little or no Pyrexia, obviously from the Enteric Fever Poison; Complication of Carbuncle, followed by Blood-poisoning and Death.

A professional gentleman, over fifty years of age, residing at Helensburgh, had a series of illnesses in his family there. Some of those affected recovered after a short febrile illness of an obscure character; but one, a girl of about seventeen, had a somewhat alarming attack, undoubtedly due to enteric fever. It was to see her that I was sent for; after an anxious illness she made a good recovery. While there, however, my opinion was sought as to the state of my friend, her father. He had been, for a fortnight or more, "seedy," obviously quite unfit for work, but without any definite symptoms, without recognizable disease of any of the organs, and without pyrexia. His temperature had been carefully taken by his attendants and was never much, if at all, over 99° F. This was on March 13th. At my request, it was taken even more critically at nights, but without discovering any elevation of temperature. I could only agree with my medical friends, that such an

illness, occurring under such circumstances, was to be regarded as due to the enteric fever poison, and that he must be watched carefully, and all precautions taken, to avoid accidents or aggravations.

After a little longer tedious waiting, the illness cleared away, but his recovery was hindered by the occurrence of a carbuncle at the back of his neck. Before very long, however, this discharged its contents and began to heal up, and in point of fact it was almost healed when alarming, and, as it proved, fatal symptoms supervened. These were characterized by fever, with at first special development of urinary symptoms characterized by hæmaturia, evidently of renal origin, and scanty secretion of urine so marked that the possibility of retention was entertained and catheters passed without relief. I saw him in this condition on April 19th, and, although regarding the case as grave, I thought the renal congestion might pass off; I could not see him again; but further alarming symptoms supervened, and he died on the 22d, just as his daughter was beginning to recover. There was no post-mortem examination, but from the details of the symptoms given to me, there was no doubt in my mind that the case was due to some septicæmic condition or blood-poisoning, a recognized, though happily rare, complication of carbuncle.

III.

Convulsions, presumably Uræmic, about the Seventeenth Day.

The first death which occurred in the epidemic of fever amongst the nurses in the Western Infirmary, already referred to, was in a nurse twenty-three years old. She had a shivering on August 27th. She had pretty high fever, with slight diarrhœa, about September 4th. One or two doses of one-half grain of opium were given, and on the morning of September 9th her bladder was found much distended, and a large quantity of urine was drawn off, which, however, was thrown away without being tested. On September 10th she had some sickness and retching, and a loose motion was passed under her, without notice, at night; a little twitching at the wrists was noted. The urine was now found to be highly albuminous, and under the microscope there were very numerous granular and hyaline tube-casts. By September 12th the tremulousness and twitchings at the wrists had increased, and the muscles of the head and neck became involved; these tremors, for a short time, were accompanied by an alarming condition, with extremely bad and intermittent pulse. The bowels were somewhat looser than before, and so a lead and opium pill was given, with apparently some benefit. About 3 A. M., on the 13th, the nurse in attendance was alarmed by the patient making a convulsive clutch at her, and both arms and legs

became rigid; the face also was found to be convulsed. She seemed quite unconscious during this convulsion, which lasted about ten minutes. The patient regained consciousness and rallied from this attack, but the high fever and typhoid aspect did not abate; there were also deafness, abdominal distention, and diarrhœa. On September 15th she had fits of trembling, the breathing became rapid, and she died with a temperature of 108° F. on the night of the 16th.

The urine was drawn off twice a day from the time of the first retention; its quantity was about 35 ounces or more in the twenty-four hours, and the specific gravity about 1020 to 1025. The tube-casts continued to be present in enormous quantity, the hyaline casts containing faint granular matter. There was no post-mortem examination.

IV.

Small Black Spot of Gangrene on the Sole of Foot, apart from Pressure. Rigors before Death.

A nurse, about thirty years of age, was sent to bed on September 8, 1884. The illness was a severe one from the beginning, with much nervous disturbance, high temperature, abdominal pains, and diarrhœa. Some intestinal hæmorrhage was noticed on October 2d, and repeatedly thereafter, sometimes in considerable quantity. Great feebleness and prostration came on, and she was put on a full-sized water-bed on October 6th, there being some redness of the back and a very small sore; this, however, did not increase, but rather improved, although the patient became worse. Next day, slight discoloration of the heels on their outer aspect was detected, but it was not very deep in color or extensive. The following day (October 8th) the fingers were dusky, and some dark discoloration of the dorsum of the feet was seen, and a small black spot appeared on the sole of the left foot, toward the outer aspect, but the skin remained quite whole in the feet till the end. The case was also complicated with cystitis. On October 13th a severe rigor occurred, and the breathing became very bad. During the next day another violent rigor occurred, and she died in the evening. These shiverings suggested pyæmic complications, but nothing more definite can be said about them.

In this case the discolored heels might perhaps have been ascribed to pressure in a debilitated subject, affecting a part of low vitality, although the area of blackness was on the outer aspect rather than the part pressed upon. The discoloration of the dorsum of the feet, however, pointed to the blackness depending on something different from pressure, although, perhaps, the weight of the bedclothes might be alleged, even here, as a source of pressure. The small spot of black gangrene, however, on the sole of the foot seemed to indicate the presence of a process quite

unconnected with pressure, and this occurrence is adduced here as pretty positive proof in this case of what is often suspected in others, although (as in the case of the black heels) the influence of pressure can but seldom be clearly eliminated.

It should, perhaps, be stated that ergot of rye was used in this case pretty freely for the intestinal hæmorrhage; and, although it was not thought possible that the gangrenous spots could be due to this agent, it was deemed wise to stop it when the black spot appeared. This could be done the more willingly as any beneficial influence from its use on the bleeding in this or other cases was extremely dubious.

V.

Alarming Nervous Disturbance developed with the subsidence of the Pyrexia.

A tablemaid in the Western Infirmary took ill on September 4, 1884, and the fever subsided on the 10th. A relapse began on the 21st or 22d, and during this relapse the temperature reached 104° F. on several days, but by October 2d it seemed as if defervescence had become established, as the temperatures only reached about 100°. All through these two attacks of pyrexia there were but few nervous symptoms, although on September 30th and October 1st, with a declining temperature, the patient was delirious, practically for the first time. On the 3d of October, and for several days thereafter, the catheter had to be used. Low muttering, with a tendency to get out of bed, now came on, and she had all sorts of terrible visions. There was also a very curious shaking and tremor of the head, with quivering in the face and eyelids; these movements of her head and eyes seemed to give rise in her mind to the idea that her attendants were staggering. When spoken to, she became quieter and answered quite nicely and sensibly, but soon relapsed into her muttering and quivering. No explanation was found in the state of the urine, which was secreted in moderate quantity and it contained no albumin. Along with this muttering and quivering there was complete sleeplessness. On October 2d a little brandy was tried, but it did not improve her. On October 3d a dose of Battley's Sedative Solution of Opium was given, and she slept an hour and a half, and on the afternoon of the 4th, after 20 minims, she again slept a little, and it was repeated at night; after this she slept four hours quietly, and was calm and settled in the morning. Some abdominal pain, complained of on October 5th, although alarming at the time, proved to be due to the menstrual period coming on. During the 4th and 5th of October she had been lying a little more prostrate than formerly, but even then she frequently lay on her sides, and even got up and tried to get out of bed at times; no such attempts occurred on the night of the 5th of October.

Between the morning of the 5th and the morning of the 6th a large bedsore formed near the sacrum, or rather at the edge of the right buttock; it measured 2½ inches in diameter. The temperature was not over 100° F. The nervous system seemed quiet. The case went on without any special symptoms. Once or twice she passed water without notice after she had begun to tell when about to do so, and once the temperature rose to about 103° F., but this was probably due to the bedsore. A trace of albumin appeared occasionally in the urine. The slough in the sore began to separate on October 11th, leaving a deep ulcer, but it gradually contracted and was nearly healed by November 14th.

In this case we had the appearance of grave nervous symptoms during the decline of the pyrexia, reaching their most alarming phase when the patient might be regarded as almost over the attack; the gravity of these symptoms was emphasized by the remarkably rapid development of a large bedsore. No doubt the explanation was to be sought in the poisoning of the nervous system from the circulation in her blood of effete products resulting from the fever, even although no albuminuria existed at this time. I have seen somewhat similar conditions, once or twice, in pneumonia—the patient passing through the height of the fever in this disease with little or no delirium, and becoming violently delirious or maniacal after the supervention of the crisis.

VI.

Double Periostitis with Necrosis.

A cleaner in the Western Infirmary, aged eighteen years, took ill with enteric fever on August 30, 1884. She had an alarming hæmorrhage, with three bloody motions, on September 5th, but she seemed to be getting over the fever on the 8th. On the 10th or 11th a relapse occurred, which underwent a favorable defervescence on October 1st or 2d. On October 20th some elevation of temperature occurred, and this was associated with pain in the right leg about two inches above the external malleolus, and this had been complained of for a day or two before. In this situation an old sore had existed seven years before, and it had discharged for a year. A few days later, swelling and tenderness appeared over the right tibia, evidently due to periostitis. About the same time some tenderness was noticed over the left tibia also. With this, great pain was complained of; the temperature ran up to 103° or 104° F. on the 27th and 28th. She was now removed to a surgical ward, under the care of Dr. Hector C. Cameron. The abscesses over both tibiæ were opened on November 12th, and bare bone felt in each; a third periosteal swelling, in the lower end of the femur, subsided without coming to an abscess. On March 3d Dr. Cameron removed,

without difficulty, sequestra from both tibiæ. Some further portion of dead bone seemed to demand removal in May, but the patient and her friends insisted on her dismissal, and so the further course of the case cannot be traced.

A point worthy of note in this attack of periostitis was the occurrence of very acute symptoms at the beginning; not only severe pain, but also very high fever (103° or 104° F. on the 27th and 28th of October). In periostitis occurring as a sequela of enteric fever, surgeons have remarked on the absence of the fever and severe symptoms common in acute necrosis. Another point of interest in this case is the history of an old affection in the leg, presumably the result of scrofulous disease many years before the enteric fever, although the position of the symmetrical periostitis in the tibiæ was different from the old scar. (See an article by Dr. Hector C. Cameron, "Cases Illustrating Some Unusual Forms of Necrosis": *Glasgow Medical Journal*, August, 1881, vol. xvi. p. 107; in this article he quotes from Sir James Paget's essay "On Some of the Sequels of Typhoid Fever.")

VII.

Gangrene of the Lung.

A lady, about forty years of age, spending her holiday in Scotland, was seized with an acute illness in passing through Glasgow about the third week of September, 1889. This proved to be a severe attack of enteric fever, with high temperature and latterly intestinal hæmorrhage. From the first time I saw her in consultation, on September 30th, there were signs of congestion and partial consolidation of the right lung. There had been a little blood in the sputa, but a somewhat free hæmoptysis took place on October 6th, and on one or two subsequent occasions. As already stated, intestinal hæmorrhage occurred, and the danger from this seemed to be subsiding; but, toward the end of October, the breath and expectoration were noticed at times to be very offensive, and the unmistakable odor of gangrene was only too certain for a few days before her death on November 2d.

VIII.

Paralysis and Anæsthesia of the Limbs after Recovering from Enteric Fever.

A mason, twenty-nine years of age, was sent to the Western Infirmary to be treated for paralysis. He had had enteric fever in the month of September, 1881; the attack was severe, and toward its close he seems to have experienced a benumbed sensation in his legs below the knees. On recovering, toward the end of November, he was able to go about

for some three weeks, although with a feeling of coldness and stiffness in the legs, and during this period he seems to have been exposed to wet weather. The weakness in his legs became worse, so that he had to lie up, and after this his hands became weak also, and rapidly became so useless that he could not feed himself. On admission, in January, the muscles of both upper and lower limbs were found to be wasted, especially the extensors in the forearm. There was also marked anæsthesia in the legs and feet, and to a less extent in the hands, arms, face, and trunk of the body. Excessive tenderness existed on handling the feet and the legs. There was a complete inability to stand; and, while lying on his back, he could not lift the legs off the bed, although he could flex the limbs at the knee to some extent. He could scarcely lift the hands up to the head, and the power of using the fingers for buttoning his shirt was quite lost; the grasp of the hands was also very feeble. No response occurred on tickling the soles of the feet: the cremasteric reflex was present; knee-jerks absent; no ankle-clonus. There seemed to be no paralysis of the bladder, although a little wetting of the bed occurred once or twice, apparently from his helpless condition. No response of the muscles of the arms and legs, even to strong faradic currents, could be obtained, while with the galvanic current it was only obtained with difficulty. Soon after admission a small sore appeared on his right scapula, from pressure evidently, but it soon healed with care.

The treatment consisted in the use of electricity, both currents being employed; and some tonic with strychnine was given.

He was admitted on January 10th, and by February 10th he could stand, if well supported; in a fortnight more he could walk with the support of a chair, and in another fortnight he could walk quite alone. The response of the muscles to the electricity improved concurrently and became normal, and the sensation likewise recovered.

His previous health had been good physically, but there was some history of mental aberration, at one time, and his intelligence was a little deficient at the best.

He was reported, two years later, to have kept well and to have gone to America.

IX.

Concurrent Development of Enteric Fever and Tubercular Meningitis and Pyelitis.

A young English gentleman, about twenty years of age, who was learning shipbuilding and engineering in one of the works on the Clyde, took ill, and after a day or two his illness became so alarming that I was asked to see him in consultation; he was supposed to have menin-

gitis. I found him in a curious dazed state, with a vacant or distant expression, repeating in a clear voice various figures, say 1230, corrected quickly or hesitatingly into some other figure, and this going on for minutes together. I was so much surprised and interested that I sat at the edge of his bed watching his face and eyes. All of a sudden, his expression changed; he saw a stranger, and asked what I was doing there, and seemed offended. I said I was merely asking his name; he gave it correctly, hurriedly adding, "That is the name on my card." I asked where he was working, and he said, "Barclay, Curle & Co"; not catching the name of the firm, he repeated it, and when I did so after him, he mimicked my Scottish trilling of the letter "r," and commented on the pronunciation. Immediately thereafter he relapsed into his figures and calculations as before, with the same far-off look, and seemed to be unaware of anyone's presence. He was reported to me to have no pyrexia, but on taking his temperature that day we found it high. No signs of disease existed in the lungs. On examination, the bladder was found distended, and as it seemed important to ascertain whether the urine contained albumin, I waited till his doctor sent for his catheter and drew off the urine. It was perfectly clear, and contained no albumin. This was on September 13, 1884. I could only regard the illness as due to some inflammatory affection of the brain. When seen, however, next day and in a day or two later, it was found that his mind was much clearer, and, on the other hand, that his temperature was persistently high. We now encouraged his mother to believe that the alarming cerebral symptoms, owing to which she was sent for, might be due to the disturbance of enteric fever and not to meningitis. The case developed with abdominal symptoms in such a way as to lead to there being no doubt in my mind that the illness was due to this fever. There were, indeed, puzzling complications in the urinary organs, with pain on micturition, and blood and pus in the urine, beginning soon after the catheterization, and (as I had not used the catheter myself) I not unnaturally ascribed the disturbances to some accident from this cause. The state of the bladder and the painful micturition probably caused him to scream out at times, and to become somewhat rigid, but we hoped the bladder would improve with the subsidence of the fever, or at least that more efficient treatment of it would then become possible. By October 3d—that is, about the end of the third week—the temperature, previously declining, became normal and remained so. Although carefully nursed and fed, he had become very thin, and some discolored blotches appeared on the left side on September 26th. With the subsidence of the fever my fears as to the case were allayed, and frequent visits on my part seemed unnecessary; feeding up seemed the only thing required. On going back, however, after eight or nine days' absence, I was startled to find him wasted to the most extreme degree, perfectly

free from fever, but with more of the obscuration of the intellect, coming, at times at least, quite suddenly. Nothing further could be found to explain his condition except the state of the urine, with pus and blood, and obviously great pain in passing it. The cerebral symptoms, however, seemed again too distinct to be ignored, and I had once more to revise my diagnosis, saying that the patient had evidently meningitis, as at first stated. He died on October 15th.

Before the post-mortem examination, I stated to Dr. Joseph Coats, who made it, that I believed we had had both meningitis and enteric fever in the case; but I could not think of any proper explanation of the extreme emaciation, or of the urinary symptoms.

The examination showed the intestinal ulceration characteristic of enteric fever, but the ulcers were far advanced toward cicatrization; they were quite clearly *not* of the tubercular form. There was perfectly distinct and typical tubercular meningitis, and extremely advanced forms of tubercular disease in the kidneys and the bladder.

The tubercular disease of bladder and kidney at once explained both the wasted appearance and the urinary symptoms. The perfectly-clear character of the urine at my first visit had kept me from thinking of this; the disease was no doubt present there long before that, but probably underwent rapid development after the catheterization.

The combination of symptoms of meningitis with those of the fever was most perplexing. The meningitis seemed to be so far arrested in its progress by the development of the fever, and reasserted itself with its subsidence.

DISEASE OF THE MID-BRAIN REGION,

WITH SPECIAL REFERENCE TO OPHTHALMOPLEGIA, AND A NOTE ON POST-HEMIPLEGIC ATAXIA.[1]

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It is my intention in this paper to analyze as briefly as possible a number of cases in which oculomotor symptoms have played an important *rôle*. I have been fortunate in obtaining two autopsies which furnished good proof of the value of those symptoms commonly supposed to indicate disease of the mid-brain region, and several other cases that were subjected to careful clinical examination, will help to enforce the points which I wish to make.

It is only within recent years that the mid-brain region has acquired great clinical and practical value. This is due largely to the anatomical

[1] Read at the meeting of the American Neurological Association, 1890.

and pathological studies of Westphal (1), Spitzka (2), Leube (3), and Wernicke (4), who have taught us to discriminate between the various subdivisions of the oculomotor nuclei, and have given us anatomical explanations of the many and complicated phenomena in polio-encephalitis superior (Wernicke), and in other conditions associated with ophthalmoplegia externa and interna.

Among other things, I wish to show that we should not be too ready to make the diagnosis of polio-encephalitis superior wherever and whenever partial ophthalmoplegia (external and internal) constitute the main symptoms of the affection. A diagnosis hastily made is often badly made.

Case I.—My first case is one of unusually severe tubercular affection of the brain in a young child. The main points of the history, which I have been able to complete through the kindness of several colleagues, are these:

The child, E. S., aged three years, was first seen about the middle of November, 1889, by Dr. J. A. Meeks, in the Eye and Ear Department of the Northern Dispensary. At that time the little girl had double ptosis, but no other ocular paralysis was observed. The child was dull and listless. The pulse ranged between 165 and 160, but the temperature was normal. She was referred to the care of Dr. Seguin, at the Manhattan Eye and Ear Hospital, where Dr. Booth[1] took a very careful history. From his notes of December 9th I gather that the mother had noticed a change in the child's disposition since an attack of measles in the previous April. The child did not care to play with other children; preferred to sit quietly by herself all day long; staggered in walking, and occasionally fell. The child had no epileptic attacks, and had vomited but once. At this time (December, 1889) the child was stupid and deliberate in all her movements; walked with her feet widely apart; no staggering; very little strength in the hands. Right hand weaker than left. No anæsthesia or ataxia; knee-jerks absent. Paresis of both levatores palpebrarum, the pupils being half covered; no other paralysis of ocular muscles. No nystagmus. Pupils equal, moderately dilated, reacting to light and during accommodation. There was at this time a suspicion of optic neuritis. Pulse 140, and temperature of axilla 100.2°.

The child was brought to my department at the Polyclinic December 28, 1889. It was not known at the time that she had been seen by Drs. Meeks and Booth. A careful examination of her condition made before the students of the Polyclinic showed that there was double and almost complete ptosis. There was no upward or downward movement of either eye; both internal recti muscles were thrown into a clonic spastic condition when an attempt was made to use them. Both internal recti were capable of very slight movements, but all other external ocular muscles were completely paralyzed. Yet, strange to say, even at this late day the accommodation reflexes were distinct, and there was slight contractility to light in both pupils. A slight left facial paresis

[1] I am indebted to Dr. Booth for his kindness in putting the hospital records at my disposal.

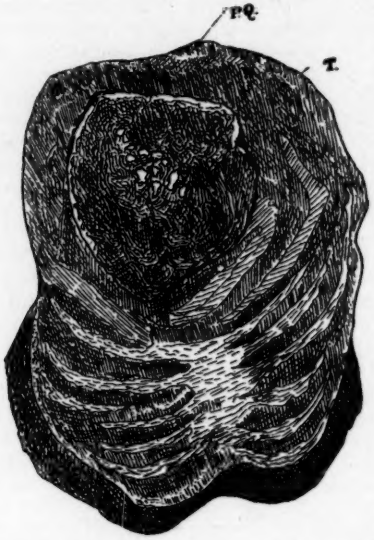
was noticeable. Vision was very much impaired. Although in a condition of semi-stupor, the child walked before the class, and exhibited in so doing most distinct staggering, which reminded one of typical cerebellar gait. She walked with a broad base, and showed distinct tendency to fall to the right side. The oculist (Dr. Webster) reported a distinct plaque of choroidal atrophy below the macula of the left eye. The reflexes were exaggerated, and there were very evident occipital headaches. The right hand was weaker than the left, but otherwise the use of all four extremities was entirely normal.

The diagnosis of tumor of the corpora quadrigemina was made, and this tumor was supposed to be associated with a general tubercular meningitis. While the ocular symptoms pointed to the region of the corpora quadrigemina, the subacute character of the onset, the involvement of the sixth and seventh nerves, the weakness of one upper extremity, and the occipital headaches, indicated a general and widespread cerebral affection. The tubercular character of the disease was diagnosticated from the general cachectic appearance of the child, from the peculiar development of the symptoms in the last weeks, and from the information given us, that an uncle of the child had just died of phthisis.

The child grew rapidly worse, and could not be brought to the clinic. At my request Dr. Peterson kindly visited the child at its home and kept track of it to the end. The child had occasional convulsive seizures, grew blind, became comatose, and two weeks before death developed left hemiplegia. There was no change in the eye symptoms, unless the light and accommodation reflexes disappeared, but this point could not be positively determined, owing to the comatose condition of the child. The child died February 4, 1890, four months after the onset of the symptoms.

By strategy and Dr. Peterson's persistence an autopsy was obtained, and the brain was removed by him. The dura was adherent to the skull, and had to be removed with the calvarium. The quantity of subdural fluid was slightly increased. There was discovered at once a tumor (solitary tubercle) near the right lateral sinus, about one centimetre in diameter and pressing upon the lateral edge of the cerebellum, producing thrombosis of the lateral sinus. Other tubercles surrounded by large areas of softened tissue were found in the cerebellum. An examination of the brain at my leisure showed that the hemispheres were healthy, with the exception of small tubercular deposits along the bloodvessels. The cerebellum was the seat of most profound changes, containing several large solitary tubercles. At the base there were several uncommon conditions; there was an unusual thickening of the pia, with small tubercular deposits between the corpora mammillaria and the optic chiasm, and in the interpeduncular space, the thickening here being so great, though probably of recent date, that both third nerves, instead of lying across the crura, after removal of the brain, pointed backward, and the right sixth was twisted out of its normal position. The brain was not cut into until it had hardened for about a week in a two-per-cent. solution of bichromate of potash. Cutting through the level of the corpora quadrigemina a tumor was found, as anticipated, the size of which will be best appreciated by an examination of Fig. 1. The brain was allowed to harden for many weeks in bichromate solutions of increasing strength, and later on in alcohol.

The sections were made from parts embedded in celloidin, and variously stained. It will be observed that there is no trace of the aqueduct of Sylvius in sections passed through the anterior quadrigeminal bodies, while in sections through the lower half of the pons one can observe the



Vertical section passing through the posterior quadrigeminal bodies.
T. Tumor. PQ. Posterior quadrigeminal bodies.

increased dilatation of the ventricle.[1] There is every reason to suppose, from a comparison of the symptoms and from the study of the anatomical specimen, that the tumor began to grow from the central gray substance. The tumor occupies almost the entire tegmental division of the crus, and has left only a very small portion of the corpora quadrigemina and the brachia intact.

Reviewing the history of this case, and comparing the clinical symptoms with the results of the post-mortem examination, we are struck by the fact that the one solitary tubercle in the vicinity of the corpora quadrigemina produced more mischief than the large number of lesions elsewhere in the brain. The occipital character of the headache, and the cerebellar staggering, are the only symptoms which can be ascribed to the tubercles in the cerebellum, though both these symptoms might be due to disease of the quadrigeminal region. Indeed, Nothnagel (5) has recently claimed that cerebellar walk and nuclear affections of the oculomotor nerves are the most distinct symptoms pointing to disease of

[1] Further anatomical details are omitted.

the corpora quadrigemina. In this he has been supported by the few authors who have reported cases since the publication of Nothnagel's article, notably by Alfred Christ (*) in an able paper on this subject.

If we consider the intimate anatomical relation between the corpora quadrigemina and the cerebellum through the anterior peduncles of the cerebellum, there is nothing surprising in the fact that cerebellar staggering should be a symptom common to disease in both of these regions. In this case it will be impossible to determine whether this one symptom was due to disease of the corpora quadrigemina or to the involvement of the cerebellum; but, inasmuch as the ocular symptoms preceded all other symptoms for some considerable length of time, it is safe to say that cerebellar staggering is not one of the *early* symptoms of disease of the quadrigeminal bodies, though it is undoubtedly a symptom that is developed in the later stages of such disease. An examination of sections through the pons showed that the sixth and seventh nerve nuclei were entirely normal; they can, therefore, not be held responsible for symptoms pointing to involvement of these nerves, but this must unquestionably be placed to the account of the basilar meningitis.

Certain it is, that this meningitis was not the cause of the oculomotor symptoms; for months, or at least for weeks, the symptoms were distinctly nuclear; both levators were affected long in advance of other muscles, and the internal recti muscles retained some function long after the other muscles supplied by the oculomotor nerves had been completely paralyzed. In spite of the manifold morbid conditions, it is most remarkable of all that the ciliary muscles and the sphincter iridis should have remained exempt during the entire period of observation—a striking proof of the fact that the nuclei of these two muscles are at some distance from those governing the other and external muscles. Moreover, the fact that the levatores palpebrarum were affected to the exclusion of other muscles for a long time would point to the main cell-nests of the third nerve nuclei as the original seat of the tumor. Whether the tumor invaded both sides at once, or whether the decussating fibres from the main cell-nests are responsible for the bilateral character of the nuclear symptoms cannot be determined by cases of tumor.

The chief inference to be drawn from this case is that symptoms of ophthalmoplegia externa and interna, if associated with symptoms pointing to a new-growth within the brain, will serve to locate that growth in the vicinity of the corpora quadrigemina.

Considering the compactness of all cerebral structures in the mid-brain region, one would expect that there could not for an instant be any difficulty in making a differential diagnosis between cases of tumor of this region and a chronic inflammatory process. One would expect a far greater number of pressure-symptoms in the former than in the

latter instance, yet the following case will serve to illustrate this difficulty:

Case II.—In August, 1889, I was asked by the late Dr. Cocks to see Mrs. L., aged forty years. She had been married for many years, but had never been pregnant; was always in excellent health until five years ago, when she began to be troubled with headaches and vomiting, cerebral in character, and a peculiar sensation in the head on looking upward. At the same time she noticed that she saw things double, particularly on the street and on looking through an opera-glass. These symptoms had continued, with slight intermissions, up to the day of examination, except that the paresis of the eyes had very much increased. She was in the habit of keeping the left eye closed altogether, in order to have single vision. Had vomiting-spells occasionally, and some few fainting-spells many years ago, which may have been due to profound anæmia. My examination was entirely negative, except as regards the eyes. There was marked paresis of both internal recti in united and single action; external recti act fairly well, but nystagmus movements result if the attempt is made to bring the eye to the outer canthus. Upward movement of the eyes barely possible; downward movement also limited. Pupils react normally to light and during accommodation. Ptosis is said to have existed, but is not present now. Knee-jerks normal, and sensation absolutely so. At this time I made the diagnosis ophthalmoplegia nuclearis externa, probably due to a polio-encephalitis chronica, but remembering the occasional vomiting, I mentioned the possibility of tumor; not really believing it, however, but yet feeling disposed to give the patient the benefit of the doubt, I urged the continuance of active mixed treatment.

The further course of events was rather surprising. About two months after I had seen the patient for the first time, I had the privilege of examining her again. She was troubled severely with headaches and vertigo, and had been alternately drowsy and wakeful. In addition to these symptoms, she developed incoördination and characteristic cerebellar staggering. On October 5th, Dr Cocks reported to me that he suspected optic neuritis; and on October 17th there was very marked double optic neuritis, and the patient was no longer able to stand without support. The symptoms of tumor were so distinct that the idea of a polio-encephalitis superior had to be abandoned. The patient died October 31st, having become almost blind and wholly unable to leave her bed for some days before death. In spite of the most strenuous efforts, the husband refused an autopsy.

The idea of tumor in this case can scarcely be rejected, yet no one, I think, would have supposed that for more than five years the growth of the tumor in this region would be so gradual as to affect certain cell-nests only, and not the entire nuclei; for it will be remembered that the sphincter and ciliary muscles were entirely free as long as a detailed examination could be made. If asked to carry the diagnosis still further, it would be fair to say that there may have been a gummatous infiltration of this region, as has been found in other cases, notably in one of Thomsen's (7); that this increased very slowly, diminishing at times and again growing anew, thus bringing about a chronic and variable

group of symptoms. This inconstancy[1] of symptoms in specific disease of the cerebral nervous system has been correctly insisted upon by Dr. Oppenheim (⁸), of Berlin, in a very able discussion of the subject. In the case I have just discussed there is still another possibility—there may have been a mere gummatous infiltration of the oculomotor nerves which caused symptoms resembling those of nuclear disease, and toward the latter part of the disease the growth of a large gumma may have given rise to those symptoms which pointed so clearly to the development of a neoplasm.

But whether we had here to deal with gumma or mere gummatous infiltration, it is important to note that the manner in which the case terminated disproved the diagnosis of polio-encephalitis which for months, if not years, was the only safe diagnosis to make.

In this connection I am reminded of the difficulty of diagnosis in still another respect: since our anatomical knowledge has been worked out to the finest details, it is a point of some practical value to diagnosticate the character of the morbid process. Syphilis—ocular paralyses, gummatous infiltration of the base—is the natural sequence of our thoughts in many cases, and yet the symptoms which we observe frequently make it difficult to determine whether the disease is of nuclear origin, or whether the oculomotor root-fibres are affected by specific disease of the base of the brain. The following case will illustrate this point:

Case III.—During many months, Dr. Gruening, who was kind enough to refer the patient to me, and myself, have had repeated occasions to examine a young gentleman from the western part of New York State. The patient is now thirty-three years of age, single; his family doctor reports that he had chancre with secondary eruption fourteen years ago, was thoroughly treated, no trace of syphilis since that time. Has never had headaches, and extremely well otherwise. Has been a hard worker for years. A year ago returned from an extended tour abroad. During this tour had spent weeks on the Lybian desert, and is inclined to think that the glaring white sand (he never wore glasses) is the cause of his trouble. Shortly after his return he noticed that he began to see double and that his eyes drooped. My examination of the ocular condition brought out the following facts: Left ptosis covering three-fourths of pupil; eyelid can be raised a little by great effort. Reflexes to light and accommodation almost normal. Left pupil possibly a little sluggish to light. Left abducens completely paralyzed. All other movements of eyes are perfect, inward, upward, and downward. Dr. Gruening found swelling and redness of the left optic disk. The patient was placed upon a most vigorous course of the iodides, taking as much as one hundred and fifty drops of a saturated solution of the iodide of sodium three times a day for weeks. This he bore extremely well, his general health remaining excellent. His condition since has varied somewhat, the rectus

[1] And yet this statement should be accepted with some reserve, for in the case of glio-sarcoma reported by Christ (loc. cit.) the symptoms were variable enough.

externus of the right eye showing slight paresis at times, and then again disappearing.

After months of treatment, and several months during which treatment was entirely suspended, the condition has changed in some respects. The left eye is now altogether better than the right eye. The left ptosis has been considerably relieved. The left rectus externus brings the eye to within one-eighth of an inch of the canthus, and all the other ocular muscles have normal function, but now the right eye is worse. The right rectus externus can bring the eye to within one-fourth inch only of the canthus. Upward and downward movements are normal, but the right pupil responds very sluggishly to light, while it does fairly well during accommodation. Right ptosis is more marked than left.[1]

In this case it is worth noting that an actual improvement of the condition of the left eye set in some time after all anti-syphilitic treatment had been abandoned, and that, while the left eye continued to improve, symptoms set in in the right eye very like those of the other eye, which had been the starting-point of the whole trouble. The entire history of the case is in favor of the specific origin of this trouble, yet if we remember that there was ptosis of one eye, paresis of the rectus internus of the same eye, and involvement of the rectus externus, while the other muscles supplied by the oculomotor nerve remained intact, we see that we have a group of symptoms closely resembling those of nuclear disease. Yet I cannot conceive, in view of the marked improvement of the left eye, that such is the case, and we are therefore forced to the conclusion that a specific infiltration of the oculomotor nerves may simulate disease of the oculomotor nuclei. This would be a point of some importance in the differential diagnosis of those cases in which apparently nuclear symptoms occurred in individuals who give no history of previous specific disease.

Fournier([9]), Rumpf([10]), and Oppenheim([8]) are all agreed as to the occurrence of partial ophthalmoplegia in cases of syphilitic disease at the base of the brain, and Thomsen's case shows that a nuclear paralysis can be simulated by a gummatous infiltration of the root-fibres.

I cannot help thinking that just as the larger peripheral nerves are mixed nerves, giving rise, under certain conditions of disease, to motor or sensory symptoms, and not necessarily to both, so the oculomotor nerve is a mixed nerve, and that certain diseases affecting the third nerve show a predilection for definite sets of fibres. The anatomy of the third nerve rootlets has not been so clearly studied that we can point out the fibres or sets of fibres going to each muscle of the eye; but there is already good reason to suppose that the innermost rootlets are those which represent the internal rectus. A comparison of this case with others leads me to believe that, while we should keep the possibility of

[1] In Feb. 1891, the patient presented himself again. The ptosis of both eyes has disappeared entirely: the right eye is entirely well, and in the left eye there is nothing but a slight paresis of the rectus externus.

nuclear lesion in mind in such cases as the one just described, a preceding history of specific infection, and the inconstant character of the symptoms, indicate specific disease of the third nerve roots, rather than of the third nerve nuclei.[1]

To the preceding cases we may add, properly enough, another in which the oculomotor symptoms were distinct, yet not so striking a feature as the peculiar disturbances of motion which lent a special interest to the case. The situation of the lesion in this instance is of special importance, by way of throwing some light upon the origin of post-hemiplegic disturbances of motion.

CASE IV.—The patient was a married woman, fifty-seven years of age at the time of death, December 2, 1889. Very nearly seven years previously patient felt dizzy one morning and found her vision rather blurred. This condition passed away, but returned again after fifteen minutes. She remained seated in her chair, was not unconscious for an instant, and had no trouble whatever in speaking. She attempted to walk, found this rather difficult, but did not fall. The difficulty increased, and by the following morning she had almost complete left hemiplegia. She could not open either eye. The attending physician noticed, on raising the eyelid, that vision was dim. What the position of the eyes was at this time could not be ascertained. Speech was also heavy and indistinct, but from this the patient recovered within three weeks. There was no defect of any other special sense. The hemiplegia was never recovered from. Patient became somewhat unruly and demented, and was finally taken to the Montefiore Home, where she was an inmate for many years. As far as could be determined, patient had never had syphilis, but there was very marked atheroma of all peripheral arteries: the patient was prematurely old. In addition to her left hemiplegia, she also had lost the use of her right leg, which had been amputated above the ankle on account of necrosis of the tibia fully six years ago. Being bedridden, she was covered with a succession of sores, and was altogether a revolting sight. The right eye at the time of my first examination was completely closed, the globe was rotated so that the pupil stood in the extreme outer corner of the orbital cavity; there was not the least possibility of movement inward, upward or downward. The pupil was widely dilated; no reflex to light; accommodation reflex, of course, could not be tested. There was rigidity of the left leg, and increased knee-jerks on both sides. The wrist-reflex was decidedly increased on the paralyzed side, but this left upper extremity was subject to the wildest ataxic movements. I call them ataxic, for they remind me of the extreme ataxic movements of the legs in the last stages of tabes dorsalis. If our patient was asked to use the paralyzed hand, say, in order to squeeze the physician's hand, this paretic extremity was whirled about so violently as to be a source of some danger to those near the bed. After a little, the arm would fall down from exhaustion, and remain quiet until aroused again. The patient's condition grew worse during the latter half of the year; she became extremely emotional and demented, took very little nourishment, and finally died December 2d. She was not intelligent enough during the time I observed her to enable

[1] This conclusion is supported by other cases to which I shall refer in a later article.

me to make satisfactory sensory tests. The diagnosis of crus lesion of right side, probably softening from thrombosis, was corroborated by the autopsy.

The autopsy was made a few hours after death. The dura was found adherent to the skull; the pia could be readily removed from the entire surface of both hemispheres. Nothing abnormal about the appearance of the convexity. An inspection of the base of the brain revealed at once the small size and extreme softness of the right crus as compared with the left. The right oculomotor nerve was as thin as a thread, the left about of normal size. The vessels of the brain were carefully examined, and no changes were found except in the post-cerebral artery of the right side, which was plugged by a firm thrombus that had evidently been formed *in situ*. Beyond the thrombus the artery had been reduced to a mere thread. The brain was handled after Meynert's fashion, the ganglia being dissected away from the hemispheres. The cortex was found entirely normal, and in all the organs above the crus there was nothing of any significance. The brain was hardened in the usual way in Müller's fluid and alcohol. Every part except that which was the seat of the lesion hardened well. After the brain had become slightly hard, the crura were cut across, showing distinctly the absolute disintegration and atrophy of the right crus, the process having exceeded the middle line by a fraction of an inch. Sections were laid throughout the pons, medulla, and spinal cord; and, almost at every level, distinct degenerated fibres were found in the pyramidal tract and in both lateral tracts, yet the degeneration was not as pronounced as one might have expected from disease of such long standing. Sections of the right oculomotor nerve exhibited complete degeneration of the fibres, while the left third nerve also showed some degeneration on cross-section, though there were but very few fibres thus affected.

The occurrence of ataxic movements in cases of crus lesion is the one point to which I wish to call attention, while the ocular condition will serve to show how radically different the symptoms are in cases in which the entire nerve is affected by disease. The cortex and the sub-cortical ganglia were entirely normal, yet this peculiar disturbance of motion was like those we are accustomed to see in the wake of infantile cerebral palsies, a full description of which has been given in a previous paper by Dr. Peterson and myself([11]). In children the lesion is very often cortical, occasionally it is in the vicinity of the ganglia, but in the case with which we are at present concerned the same order of symptoms is produced by a lesion much further caudad. I accept this case as proof of the correctness of the views previously expressed, that these peculiar movements may be due to the removal of inhibition, but that there must be some irradiation of nerve force from one half of the central nervous system to the other, and that this irradiation takes place at any diseased level as low down as the pons and medulla, and possibly even in the spinal cord. Associated movements are explained readily enough on this hypothesis, but why these extreme and violent ataxic movements should occur by transmission of motor impulses through such an imperfect motor tract as we had before us is not so easy to see.

It would seem as though the motor impulses in this case had been transmitted from the healthy side—a sort of overflow of volitional energy from the sound side which is not restrained by the ordinary inhibitory force; the removal of this inhibitory force being due to the lesion in question. From all of which we make the very natural deduction that the two halves of the central nervous system in health coöperate by antagonizing each other's forces, each half in health placing a check upon the superabundant energy of the other.

The preceding communication will serve to illustrate the following points:

1. The slow onset of oculomotor symptoms associated with ataxia and vomiting point to a neoplasm in the vicinity of the corpora quadrigemina.

2. The diagnosis of polio-encephalitis superior (Wernicke) should not be made unless tumor of the quadrigeminal region can be positively excluded.

3. Paralyses of one or more muscles, and not of all muscles supplied by the oculomotor nerve, do not necessarily imply a nuclear lesion. This is particularly true of syphilitic cases, in which an affection of the nerve rootlets may give rise to symptoms exactly like those of nuclear disease.

4. Post-hemiplegic ataxic movements may result from lesion of the crus, and probably from lesion in any part of the motor tract.

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THE TREATMENT OF PENETRATING GUNSHOT WOUNDS OF THE ABDOMEN,

With an Analysis of One Hundred and Sixty-five Cases Treated by Laparotomy.

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In the *Revue de Chirurgie* of February, 1890, in an elaborate article fifty-three pages in length, two well-known French surgeons, M. Reclus

and M. Nogués, make a vigorous attack upon what they are pleased to call the "American" method of treating gunshot wounds of the abdomen. In a long argument, supported by eighty-eight tabulated cases treated conservatively, the old "Laissez-Faire" doctrine is again preached with an enthusiasm which will be sought for in vain in the writings of its earlier advocates; for while these (the earlier advocates) clung to the principle of non-interference, most of them did it as the drowning man clings to the straw—not because he believes it has power to save, but because it is the only thing he can lay hold of. But here we have the principle set forth in an entirely new aspect, and if the bold claims which are advanced in support of it are true, then, indeed, are the laurels which American surgeons have won in this department of their art destined to be short-lived.

The penetrating shot-wound of the abdomen, so dreaded by the surgeons of the past—and justly, too, it would seem, when the highest authorities place the mortality between 80 and 90 per cent.—is now, for the first time, shown to be a comparatively insignificant injury, with a mortality of only 25 per cent.

We naturally expect these brilliant and extraordinary results to be accredited to some newly-discovered method of treatment, but finding the old method of non-interference carried out in every case, we are forced to look for some way of explaining the lack of harmony in the results.

In the *Med. and Surg. Hist. of the War of the Rebellion*, Part II., vol. ii. p. 202 (Otis), we find 3249 cases of penetrating shot-wounds of the abdomen treated expectantly; of these, 88 per cent. died. In the Franco-Prussian War, 1870, 1600 cases of penetrating wounds of the abdomen were reported, with a mortality of 69.47 per cent. (*Centralblatt für Chirurgie*, Dec. 1889).

Still later are the statistics of the Tonkin War—72 cases, with a mortality of 75 per cent. (*Archiv de Méd. et Pharmacie*, 1889).

If to the foregoing we add the New York statistics reported by Dr. Lewis A. Stimson (*N. Y. Med. Journ.*, Oct. 22 and Nov. 2, 1889), we have a total of 4958 cases of penetrating wounds of the abdomen treated according to the method of abstention and showing a *mortality* of 81 per cent.

In spite of these figures, believed by many of the best authorities in abdominal surgery to be too low rather than too high an estimate of the mortality of penetrating wounds of the abdomen—at all events, high enough, it would seem, to convince anyone of the inadequacy of the method of non-interference—its new defenders and champions have given us a table containing 88 cases of shot-wounds of the abdomen, with signs sufficiently pathognomonic in their opinion to warrant their being considered as penetrating, with a mortality of only 25 per cent.

This brilliant record they point to as proof of the superior results of abstention.

In my former paper (published Oct. 18, 1888, *Boston Med. and Surg. Journ.*) in reference to this very point, viz., the large number of cases of recovery without operation, cited by M. Reclus in a previous article, I said: "More light must be thrown upon some very important omissions of M. Reclus before he can have good ground for expecting American surgeons to accept his views. Suppose we accept his 50 cases of recovery without operative interference as authentic, what do these prove? Absolutely nothing, until we are told how large a number of cases that did not recover were found before getting the 50 cases that did recover."

In his recent tables containing 88 cases with only 22 deaths, the author evidently considers this point satisfactorily disposed of, and would have us believe that out of 88 cases of penetrating shot-wounds of the abdomen, 75.7 per cent. recovered under conservative treatment.

Without in any way casting the slightest suspicion upon the trustworthiness of the statistics or the conscientiousness exercised in the selection of the cases, I think it can still be claimed that the tables prove *absolutely nothing* as regards the comparative merit of the two methods of treatment. The cases referred to are either cases which have been collected from published reports in the various medical periodicals or cases which have come under the immediate observation of the writers themselves. Now, as a matter of fact, a very small proportion of the fatal cases would naturally find their way into medical journals, while there would be every reason for bringing to notice a case of recovery from an injury that had come to be regarded, in the light of the best surgical opinion, as almost universally fatal.

In this way the large number of recoveries in the table can be easily explained; far more easily than by supposing that the unanimous opinion of the most renowned surgeons for generations as to the high mortality of this class of injuries has been totally without foundation.

It might, however, be said on the other side that the same objection would apply to the statistics of cases treated by laparotomy, but a moment's thought will convince one that this is not so.

While there are a few scattered cases before 1883 and 1884, not until then did the brilliant successes of Kocher, Bull and Hamilton bring the operation prominently before the surgical world. It soon became a leading subject of debate in nearly every surgical society of this country, and a glance at the reports of European societies will show that the interest in it was not confined to America alone. Every new case in which the operation had been performed was eagerly sought for, and whether successful or otherwise its result, with rare exceptions, was soon made public.

Again, it has been objected that the opinion as to the high mortality of this class of injuries is based upon military statistics, and that in consequence of the larger size of the bullets in these cases the mortality would necessarily be much higher than in cases occurring in civil life. A glance at my tables will show that the severity of the lesion and the mortality bear no direct ratio to the calibre of the weapon, and that even the smallest bullet has caused extensive visceral injuries. Dr. Stimson, in his very admirable monograph already referred to, says in regard to this point: "The size of the opening, while corresponding in a measure to that of the bullet, is yet so seriously affected by other circumstances that no favorable prognostic influences can be safely drawn from the small size of the ball. Thus, in Kocher's case, a 0.22 calibre bullet made an opening in the stomach 1½ centimetres in diameter, and a small ball entering obliquely[1] or cutting along the convexity of a loop of intestine has made an opening an inch or more in length."

In their efforts to detract from the success of the operative method of treatment, M. Reclus and M. Nogués object to the tables of the "interventionists," and accuse them of placing to their credit cases of simple enterorrhaphy practised upon a single coil of wounded intestine protruding from the wound—a simple operation, not dangerous, and in no respect resembling a complete laparotomy, with careful examination of the entire intestinal tract; and they further say that these cases cannot be counted among those "saved by laparotomy," nor likewise can those in which there was no visceral injury and the intestines were not perforated, and with this assumption they at once proceed to exclude in a wholesale manner the cases of Sevastopoulo, Skelly, Smartt, Murphy, Barker, Brown, Cabot, Jalaguier, all of which recovered under operation, thus reducing the number of cases in Class I. (operation performed within first twelve hours of the injury) from 55 to 47, and increasing the mortality from 63 per cent. to 76 per cent. The cases in Class II. (operation after twelve hours) are dealt with in the same way, and the cases of Bull, Andrew, Frick, Newald, Gaston and Hillmantel (4 recoveries and 2 deaths) are ruled out, raising the mortality to 90 per cent.

Before dealing with the question as to the propriety of excluding the above-mentioned cases, there are a number of cases in M. Reclus's tables (103 cases treated by laparotomy, *Revue de Chirurgie*, May, 1890), the removal of which admits of no question. First, the two cases accredited to Hillmantel (both fatal) are duplicates, appearing a second time under the name of Fenger, who performed the operations, Hillmantel simply assisting and reporting the cases, as may be seen by referring to the original reference (*Journ. Amer. Med. Assoc.*, July 21, 1888).

[1] The recent experiments of Schachner bear out the same conclusion.

Again, the cases of Larry, 1799, Judson, Bently and Gill (*War of the Rebellion*, see Otis's *Hist.*) were all cases of "simple enterorrhaphy," the wounded gut protruding, and in none of them was a true laparotomy performed. It is singular that these cases, the very ones which Reclus claims should be excluded from the tables of the "interventionists," should find a place only in his own tables.

As late as 1877, "Bauden's enlargement of the parietal wound remained unique," Stimson (*loc. cit.*). Thus 6 cases, 5 deaths and 1 recovery, should undoubtedly be excluded, thus reducing the total mortality of M. Reclus's tables to 64 per cent.

Now a word in regard to the 12 recoveries which M. Reclus says should not be counted among those saved by laparotomy.

The cases of Cabot and Jalaguier were both perforating wounds of the stomach.

The cases of Vaslin and Sevastopoulo, multiple wounds of the small intestine, and in both resection of a portion (2 to 4 centimetres) of the small intestine was performed.

The cases of Smartt, Murphy, and Barker had extensive wounds of liver and blood in abdominal cavity.

In the case of Bull, operation was done twelve and a half hours after injury. There was profound shock, surface of body cold, temperature 94°, and evidence of internal hæmorrhage. Operation was done to control hæmorrhage, if possible, but patient died one-half hour after ether was started. Would abstention have given any better chance of recovery?

The cases of Brown, Andrews, and Skelly showed a considerable quantity of blood in the abdominal cavity. The abdomen was washed out and the patients recovered.

The cases of Gaston and Frick are the very cases in which Reclus himself advises laparotomy, viz., where well-marked signs of peritonitis have developed. The case of Gaston was operated upon at the end of the fourth day (surgeon not called before). The intestines were found greatly distended and there was a large quantity of decomposed blood and pus in the abdominal cavity. The patient died two hours after the operation; the autopsy showed *no wound* of the intestinal tract, and only an abrasion of the colon.

In the case of Frick the patient was not found until twenty-five hours after injury; was brought to camp hospital two days later, and signs of peritonitis having developed, operation was performed on the sixth day. A large lacerated wound of the liver was found and a deep abscess had formed along the track of the bullet. A six-inch abdominal incision and free drainage; patient made a good recovery.

M. Reclus, in all his writings on this subject, argues upon the assumption that a penetrating wound of the abdomen is serious and likely to be followed by fatal consequences only when perforation of the intestines

exists, and rarely then unless fæcal extravasation has taken place. In other words, that the chief and almost only cause of death (aside from hæmorrhage) is peritonitis. That this is a false assumption was very ably and conclusively proven by Dr. J. Marion Sims in his well-known paper ([11]) published in the *Brit. Med. Journal*, 1882. He says: "When I went to Sédan, in 1870, as surgeon-in-chief to the Anglo-American Ambulance Corps, I went in the hope that I might do something to elucidate the subject of the treatment of gunshot wounds of the abdomen. I learned this great truth—that all the cases died of septicæmia. The post-mortem examination showed large quantities of bloody serum in the abdominal cavity. In every case there was this evidence of blood-poisoning, and there was not the slightest evidence of peritonitis. There was not a single exception to this rule. Bloody serum is an ordinary result of any gunshot wound of the fleshy parts of the body, and it is not unnatural that it should be found in wounds of the peritoneum. It is possible that an escape of flatus or of contents of the intestine may give intensity to the poisonous quality of the bloody serum in the abdomen."

That perforation of the intestine is by no means necessary to render the wound fatal, is not only shown by the case of Gaston which I have already cited, but is proved in a very striking manner by the four cases of Dr. Hunter McGuire ([14]) reported at the meeting of the American Medical Association, 1881. These cases were all shot-wounds of the abdomen (2 military, 2 civil), but the ball passed transversely through the abdominal wall without penetrating the parietal peritoneum, simply bruising it. All the cases died, and a considerable amount of bloody serum was found in the abdominal cavity in every case; in reference to these cases Dr. Sims says: "Death resulted practically as it would have done had the peritoneal cavity been penetrated and the intestine perforated."

Enough has been said, I trust, to show that wounds of the abdomen to be fatal do not require perforation of the intestine, and enough to justify the right to place the 12 recoveries above referred to to the credit of operative interference. Taking for granted the proposition which I shall attempt to establish later on, that operative interference in penetrating shot-wounds of the abdomen produces results superior to those obtained by abstention, one very important point still remains to be decided, viz., Shall the principle of interference be subject to more or less narrow restrictions, or shall it be regarded as a principle of universal application? Upon this point the advocates of laparotomy are divided.

Dr. Stimson, in the paper already referred to, says: "Between the two parties—those who would operate in every case, and those who would operate in none—stands a third, those who would operate only when symptoms indicative of dangerous processes have appeared; but I believe this plan the most dangerous of all, and if it were generally

followed would lead to the entire abandonment of the operation. We know that an individual in fairly good health can have his abdomen explored without very great risk, and one who has received an abdominal wound not necessarily fatal ought at the moment, or shortly after, to be able to bear an exploration equally well. In such cases the risk of operation, when performed under the proper safeguards, is, I believe, less than that which the bullet has probably inflicted, and it is in such cases that I believe the operation is capable of valuable and superior results."

Dr. Stimson then goes on to say that if several hours, or perhaps a day, has elapsed and the patient is doing well, it might be better to abstain from interference; while if the condition has decidedly changed for the worse and signs of peritonitis have developed, the indications for refraining from operation are even stronger, and though the case may be considered hopeless without it, it is all the more hopeless with it.

To take these two classes of cases in order: first, a word in regard to those cases in which, after the lapse of several hours, the patient is apparently "doing well." Dr. Bull's first case is in point—seventeen hours had passed. There was some pain and tenderness, but pulse and temperature were normal, and patient was "doing well." Laparotomy was performed; seven wounds of the small intestine were found and two pints of bloody serum and clots were found in the abdominal cavity. The wounds were closed, the abdomen washed out, and the patient recovered. Can anyone believe that the case could possibly have recovered without operation? The case of Lange is likewise in point. Twenty-four hours after the injury the condition of the patient was as follows: No shock. Pulse 112. No pain. Abdomen tender and some tympanites. Laparotomy disclosed seven perforating wounds of the small intestine. Wounds were closed, and patient recovered without a bad symptom.

In regard to the second class of cases, when the condition of the patient has become much worse and symptoms indicative of dangerous processes have developed: in addition to the case of Frick, already cited—operation on the fifth day, recovery—I will mention that of Priddy, in which the operation was done 108 hours after the wound had been received, and showed a wound of the colon six inches long; a wound of the mesentery and of the jejunum, and in addition a considerable quantity of bloody serum and pus in the abdominal cavity and well-advanced peritonitis. The wounds were closed, the abdomen washed out with warm 1:10,000 bichloride of mercury, and the cavity drained. The patient made a good recovery.

These cases are cited, not to lessen in any way the belief in the great advantage of the *early* operation, for that has been conclusively proved by the history of the first class of cases, but to show that those cases which have gone on until *dangerous symptoms* developed before they

came into the hands of the surgeon, and are "hopeless without operation," are *not more* hopeless with it.

Sims, in reference to late operation, when signs of peritonitis have already developed, says: "Nature cures peritonitis in the early stages by uniting contiguous inflamed surfaces by the intervention of plastic lymph; but if the inflammatory process has gone further, and the plastic exudation has terminated in pouches of pus in the folds of the intestines, or purulent effusion in the peritoneal cavity, then death follows from the absorption of the fusiform collection. In this stage why should we not open the abdomen before it is too late, liberate the adhesions, and remove the matter which is imprisoned in pouches or free in the cavity?"

This can be done, and will be done, for it is but the imitation of Nature's clumsy efforts in this direction. It is true that these conclusions of Sims are entirely theoretical, arrived at by inductions based upon his experience in the operative treatment of ovarian disease. To show that they were well founded I need only to call attention to the constantly-increasing number of recoveries from general septic peritonitis, treated by laparotomy and drainage. The case of Sands, following perforation of the appendix (*Medical Record*, February, 1888), was considered almost unique, but the number of cases since recorded shows a brilliant outlook for the operation in the future.

Within the past six months there have been two cases of recovery from acute septic peritonitis treated by laparotomy at the New York Hospital, by Dr. W. T. Bull, the one from the perforation of a gangrenous cæcum, and the other consequent upon the rupture of a suppurating Fallopian tube. Dr. Stimson himself has very recently had a similar case in private practice following a perforating appendicitis, in which he operated more than twelve hours after the acute symptoms had developed, and found a considerable amount of seropurulent fluid in the abdominal cavity. The patient made a rapid recovery. The experience of Tait still further confirms us in the opinion that operative interference should be resorted to in the desperate cases we are considering. Writing in 1885, he says ([24]) that since Wiltshire first did a laparotomy for acute peritonitis in 1868, and the patient recovered, he himself has opened the abdomen forty-four times for peritonitis, and forty-one of the patients recovered; that he began by operating for peritonitis following ovarian disease, but soon became convinced that there was no reason whatever for thus limiting the operation, and since then he has never allowed a patient to die from peritonitis without opening the abdomen, provided the consent of his colleagues and of the friends of the patient could be obtained. That this principle is rapidly gaining ground, not only in England and America, but also on the Continent, is shown by the recent paper of Kreke ([21]), "On the Surgical

Treatment of Peritonitis," in which he says: "The treatment of peritonitis, following perforation of the appendix is *operative*, and no other means are for a moment to be considered. When the knife is used promptly the most hopeless cases may recover."

And still again, if further proof were needed, by the excellent contribution entitled "The Surgical Treatment of Peritonitis," read at the last Congress of French Surgeons, by Professor Demosthene ([22]), of Bucharest.

Before concluding my defence of the "American method" of treating gunshot wounds of the abdomen, I will quote a few lines from a well-known French authority on this subject.

Verchère, in a most admirable and exhaustive monograph on "Wounds of the Intestine by Arms of Small Calibre," published in the *Revue des Sciences Médicales*, 1888, page 297, after having gone over the whole literature of the subject, from Hippocrates down, carefully reviewing the thesis of St. Laurens, and analyzing the cases of recovery that form the basis of M. Reclus's argument, says: "From this we conclude, with the *Americans*, that every penetrating wound of the abdomen is a perforating wound, and that every perforating wound of the small intestine is fatal, and, save with very rare exceptions, followed by death."

Referring to the cases of recovery treated by abstention, he adds: "By the same method of reasoning one might prove that falling from a seventh-story window was a comparatively trifling matter, for it would not be impossible to collect a certain number of recoveries from such an accident."

But these so-called recoveries will hardly stand the test of rigid analysis.

Of the 34 recoveries of St. Laurens, Verchère finds that only 7 can be regarded as wounds of the intestine; and, after searching through all the publications that he could find, he was able to collect only 18 recoveries out of a very large number of cases—several thousands.

In the recent experiments of Schachner, of Louisville, upon dogs, we find that in 32 cases treated by laparotomy the mortality was only 45.1 per cent., while of the 5 cases treated without operative interference only 1 recovered, and in this case there is "strong probability that very slight, if any, injury occurred."

Hydrogen-gas Test.—Three years ago, rectal insufflation by hydrogen gas, as a means of ascertaining whether or not the alimentary canal had been wounded, was proposed by Dr. Senn, of Milwaukee. Dr. Senn's brilliant work in the field of abdominal surgery, both clinically and experimentally, was sufficient reason for its early recognition and almost general acceptance. While some of the more enthusiastic surgeons admitted its claim to "infallibility" without question, others were more conservative, and, while not denying its advantages, reserved their

opinion until its merits had stood the test of actual experience. A few others openly objected to the test. Dr. Arthur T. Cabot, of Boston,[1] was among the first to formulate these objections. In the course of his remarks he says: "Dr. Senn's other work in abdominal and other branches of surgery has been so full of practical suggestions that a surgeon having a perforating wound of the abdomen, and neglecting to apply a test so highly praised by him, is open to the charge of a disregard of necessary precautions, if he cannot show good reason for his neglect. Further experience may show the objections I shall state to be purely theoretical, but until this is demonstrated I shall prefer to treat wounds of the human abdominal cavity in a less experimental way."

The chief objections to the test are briefly these:

1. The test is not an "infallible" index of the condition of the alimentary canal.

2. The danger of producing infection of the peritoneal cavity.

3. It shows nothing as to the condition of other viscera, wounds of which *frequently* demand operative interference.

4. It prolongs the operation; interferes with respiration; adds to the shock.

5. It increases the liability of the sutured wounds to give way.

These objections are theoretical, perhaps, at first, but it would seem that at the present time a sufficiently large number of cases are on record to make it possible to draw some definite conclusions as to the value of this method.

In an exhaustive paper read at the International Medical Congress at Berlin, August 8, 1890, on the "Diagnosis and Treatment of Penetrating Wounds of the Abdomen,"[2] Dr. Senn discusses the question at considerable length, and to strengthen the argument in favor of the test, he gives in detail a report of six cases that had come under his personal observation as "A Clinical Contribution in Testimony of the Value and Reliability of the Hydrogen-gas Test in the Diagnosis of Penetrating Gunshot Wounds of the Abdomen."

Of these 6 cases, 3 recovered and 3 died. One, in which the test gave a negative result, was not operated upon, and, in spite of the fact that there was moderate hæmaturia for two or three days, the patient recovered.

In one other case that recovered, the gas-test gave a negative result, but, owing to some defect in the bag, thorough insufflation could not be obtained. The stomach and large intestine were distended, but showed no perforation. Owing to the doubt as to the condition of the small

[1] Boston Med. and Surg. Journ., 1889, ii. 81.

[2] Journ. of the Amer. Med. Assoc., Aug. 30, 1890, p. 311.

intestine, laparotomy was performed. *No wound* of the alimentary canal was found, but some blood and *pieces of clothing* were found in the abdominal cavity. It would seem that in this case recovery was due to the fact that the bag leaked, for, had the apparatus been in perfect order, the test would have shown the intestinal tract intact, and there would have been no indication for interference, the patient's general condition being (as it was) very good.

The third case of recovery happens to be the only case on record in which the intestine had been wounded (and hydrogen-gas test used). In this case thorough irrigation was employed and a drainage-tube left in the abdomen. On the fourth day a fæcal fistula appeared at the site of the drainage-tube.

I have been able to collect a series of 14 cases in which the hydrogen-gas test has been resorted to (including Dr. Burrell's case, in which air was used instead of hydrogen gas) as a means in diagnosing shot-wounds of the abdomen. A careful analysis of these cases shows that 11 cases died and 3 recovered.

The 3 recoveries were Dr. Senn's cases, and were referred to at length above. In the 11 fatal cases the cause of death was peritonitis in 10 cases, hæmorrhage and shock in 1. The total mortality in the 14 cases is 78.5 per cent.—surely not a brilliant showing.

Dr. Senn has attempted to answer the principal objections to the test, but are the answers satisfactory?

The infallibility of the test is no longer claimed, even by Dr. Senn himself, and in giving up that point the test has suffered greatly, for, if it is not *infallible*, how is the surgeon to act when it gives a negative result? The unfortunate experience of Dr. Dalton,[1] of St. Louis, in two successive cases, proves the objections to the test not merely theoretical, but painfully practical.

In one case, a careful application of the test failed to show any perforation of the stomach or intestines. Dr. Dalton said that his faith in the test was so great that he was satisfied they were uninjured. The patient died twenty-eight hours after the injury, and the autopsy showed two holes in the stomach (each one-half inch in diameter) and a large, lacerated wound of the left kidney.

In the second case the test gave positive evidence of perforation, but the distention was so great that it interfered seriously with the respiration; added to the shock, made the restoration of the intestines to the abdominal cavity almost impossible, and caused a rupture of some of the sutured wounds, causing fæcal extravasation. The patient died, and, to quote the words of Dr. Dalton, "here was a case in which Senn's method not only did no good, but absolutely did a great deal of harm."

[1] Weekly Medical Review, 1889, 23, 243.

Another very instructive case is a case of Fenger's.[1] The external wound was a little to the right on a level with the umbilicus. Thorough insufflation with hydrogen gas gave *negative* result, which, in spite of the fact that the abdomen showed a "changing line of dulness," was thought to be a sufficient reason for non-interference. The wound was dressed on the sixth day, and an area of well-marked induration found. Signs of suppurative peritonitis quickly developed. Laparotomy was performed and eight ounces of purulent fluid, having a fæcal odor, were found in the abdominal cavity, along with other evidences of a well-advanced peritonitis. The patient died eight hours after the operation. The autopsy failed to disclose any perforation of the intestine, and Dr. Fenger goes so far as to cite this case as "an illustration of the proficiency of the gas-test in a case where there is no perforation," and he goes on to say, "we may safely say that one unnecessary laparotomy was prevented."

In view of the fact that of the nine cases in which the abdomen has been opened and the viscera found intact, six of the cases operated upon early recovered, while in two of the fatal cases laparotomy was not performed until the fourth and sixth days, and then for an already developed septic peritonitis, is it not possible to arrive at a different conclusion from Dr. Fenger's? The case not only "illustrates the proficiency of the hydrogen gas test," but it illustrates still more forcibly the danger in relying upon it as an index as to the necessity of operative interference. Had the wound been enlarged and cleansed, laparotomy performed, and the blood removed, there is good ground for believing the patient would have recovered. There is another source of danger in the gas-test, and that is the increased liability to septic infection. It is true that Dr. Senn denies this, and he cites the results of a large number of experiments on dogs to prove that fæcal extravasation is exceedingly rare; but the fact that ten of the eleven deaths in which the test had been used at the operation were the result of septic peritonitis, surely does not tend to lessen our fears. Much is made of the fact that hydrogen gas is aseptic. Such may be its character when it enters the rectum, but it is difficult to see how it could remain so after having traversed the intestine, and it might readily introduce into the abdominal cavity a sufficient number of germs to produce infection, without causing any *visible* fæcal extravasation. While the gas-test is to be condemned as a means of *diagnosis*, there remains a field wherein it may prove a useful adjunct to laparotomy, and that is to detect perforations that might otherwise be overlooked. For this purpose hydrogen gas has no advantage over atmospheric air. Even this limited use of the gas-test has its disadvantages, and it is still open to doubt whether the risk of having

[1] Journ. Amer. Med. Assoc., July 21, 1888.

left an undetected perforation is not *more* than counterbalanced by the dangers arising from distending the intestines and increasing the liability of the wounds already sutured to give way.

At present the observations are too few to determine this point. Since the publication of my former paper, October, 1888, containing 74 cases of penetrating shot-wounds of the abdomen treated by laparotomy, I have been able to collect 91 additional cases, making a total of 165 cases. The greatest effort has been made to obtain all the cases that have been operated upon, without regard to result. My tables contain a large number of unpublished cases, obtained from hospital records or from personal notes from the surgeons who performed the operations.

Of the total number, 165, there were 54 recoveries and 111 deaths, giving a mortality of 67.2 per cent. Of this number there were 81 cases of wounds of the *small* intestine, with 25 recoveries, or a mortality of 67.5 per cent.; 24 cases of wounds of stomach, 6 recoveries, mortality 75 per cent.; 36 cases of wounds of colon, 12 recoveries, mortality 66.6 per cent.; 19 cases of wounds of liver, 8 recoveries, mortality 58.7 per cent.; 11 cases of wounds of kidney, 1 recovery, mortality 90.9 per cent.; 50 cases, carefully analyzed, showed a mortality of 66⅔ per cent. for wounds of the small intestine uncomplicated with other visceral injuries, and 70 per cent. when other viscera were wounded.

Wounds of the stomach, liver, and colon all showed the same mortality in *uncomplicated* cases, 66⅔ per cent.

In the 81 cases of wounds of the small intestine there were 439 perforations, or an average of 5.4 for each case.

Laparotomy was performed in 9 cases in which no viscera were wounded; of these 9 cases, 6 made prompt recoveries, and in 2 of the fatal cases the operation was delayed until the fourth and sixth days, and then performed with the patient *in extremis* for septic peritonitis.

There were 25 cases in which the alimentary canal was found intact; of these, 12 recovered and 13 died; mortality 52 per cent. (this includes many of the fatal kidney cases); 16 cases of resection, 3 recovered.

Hydrogen gas-tests were used in 13 cases; of these, 11 died, 2 recovered; mortality 81 per cent. (The test was used in one other case in which operation was not resorted to, and patient recovered.)

Of the total 165 cases, in only 9 instances did the operator fail to find all the perforations.

In 48 cases, where the causes of death were given, 25 were assigned to septic peritonitis, 19 to shock, 4 to hæmorrhage.

In 16 cases, where drainage was used, 6 recovered and 10 died; mortality 62.7, slightly below the average.

Conclusions.—Given a shot-wound of the abdomen, the indications are:

1. *Exploratory incision* in the region of the wound to ascertain whether or not it is *penetrating*.

2. If penetrating, *median laparotomy* as soon as possible after the injury has been received unless suffering from severe shock.

3. Signs of a peritonitis, just beginning or well developed, while diminishing the chances of success, are by no means a contra-indication for *operative interference*.

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THE ANATOMY AND PHYSIOLOGY OF THE FAUCIAL TONSILS WITH REFERENCE TO THE ABSORPTION OF INFECTIOUS MATERIAL.[1]

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Although very much has been said and written about the diseases of the tonsils, but little attention, comparatively, has been given to their normal structure and to the *rôle* which they play in the animal economy.

The descriptions of their minute structure in most text-books of anatomy and histology, and even in special treatises on the throat and nose, are exceedingly meagre. This would account in part, at least, for the considerable diversity of opinion which exists concerning their pathological conditions. We have little definite knowledge of their functions. Certain theories have been propounded, but none have been sufficiently conclusive as to have lead to any very general acceptance.

In view of this these studies are presented. They have involved the examination of a large number of tonsils, both human and from some of the lower animals, *i. e.*, dog, cat, rabbit, monkey, and raccoon; and they include the results of a considerable number of original physiological experiments.

The tonsils belong to the lymphatic apparatus; and in order to make the description of them more intelligible, it seems wise to review the structure of the better known lymphatic organs before describing the tonsils in detail.

[1] Being the Alumni Prize Essay of the College of Physicians and Surgeons, New York, 1890.

The structures of the lymphatic apparatus may be classified, on an anatomical basis, in three groups.[1]

1. The simplest form of these structures are the minute masses, consisting of connective tissue, reticulum, or basement-substance, the meshes of which are filled with small spheroidal cells. These structures, which were first described by Arnold,[2] are found scattered in many of the viscera, *i. e.*, lungs, liver, and kidneys. The reticulum is exceedingly fine and delicate, and is lined by endothelium. The spheroidal cells are about the size of or somewhat larger than leucocytes, and may contain one or more nuclei. The masses are not clearly outlined, but gradually merge into the surrounding tissues.

2. Of more complex structure are certain nodules of lymphoid tissue occurring in the walls of the stomach and intestine, the so-called "solitary and agminated follicles or glands." Inasmuch as they are in no respect either follicles or glands, they are more properly called lymph nodules. The solitary nodules are little pear-shaped masses lying principally in the submucosa, and are composed of a reticular network, whose meshes are more closely arranged about the periphery. The meshes are lined with endothelium, and are filled with lymphoid cells. In the periphery is a rich network of bloodvessels and lymphatics. The bloodvessels send but a few branches into the more central portion of the nodule. They lie beneath the epithelium of the gut, through which lymphoid cells constantly pass. The epithelial covering is oftentimes thinned and excavated by pressure of the nodule upon it. Peyer's patches, or the agminated nodules, are aggregations of a number of these masses.

3. The most complex of the lymphatic structures, so complex, indeed, as fairly to merit the term organs, are the lymph nodes, often incorrectly called lymph glands. These are oval or irregular-shaped bodies, which interrupt the passage of lymph through the lymph vessels. They are surrounded by a fibrous tissue capsule, which furnishes numerous trabeculæ to the interior. In the outer or cortical zone are a large number of lymph nodules furnished with cord-like anastomosing bodies, which ramify the inner or medullary portion, the lymph cords. The nodules and cords are composed of the same sort of tissue as are the lymph nodules of the intestine, except that their surfaces are covered by endothelium. Both are surrounded by a coarser reticular network containing a few lymphoid cells, the lymph sinuses. The bloodvessels, except the few branches supplying the connective tissue, ramify in the

[1] The spleen seems to belong more properly to the hæmatopoëtic rather than to the lymphatic system.

[2] Virch. Arch., Bd. 80, 82, 83.

lymph cords and lymph nodules, while the lymph circulates in the lymph sinuses.

The tonsil corresponds more nearly in structure with a Peyer's patch.

Gross Anatomy of the Faucial Tonsils.

The tonsils, two in number, are situated on either side of the mouth, between the anterior and posterior pillars of the fauces, and are more or less covered by folds of the mucous membrane. They are of a pinkish color and oval or almond-shaped. Their long axis, when the mouth is widely opened, is nearly vertical. When the mouth is closed they tend to approach one another, the long axis being more nearly horizontal. Externally they are covered by a layer of fibrous tissue derived from surrounding parts, and which serves as a partial investing sheath. They are covered by the superior constrictor muscle, which separates them from the internal carotid arteries. The internal or free surface projects into the cavity of the mouth; it is covered by stratified squamous epithelium, continuous with that of the mouth. In size the tonsils vary considerably at different ages, and in different persons of the same age. According to Sappey[1] their average vertical measurement is from 20 to 25 mm.; antero-posterior, 12 to 15 mm.; transverse, 10 to 12 mm. As a rule, they are relatively larger in childhood, as is the case with the rest of the lymphatic apparatus.

They reach their maximum size in early adult life. They afterward tend to atrophy, and in old age may become almost entirely obliterated, or converted largely into fibrous tissue.

They are composed, in general, of an aggregation of lymph nodules, separated from one another by diffuse lymphoid tissue, and arranged about a series of depressions from the surface, from eight to fifteen in number, the crypts. These crypts are lined by epithelium similar to that on the surface.

Blood-supply.—The following arteries supply the tonsils:

1. Branches from the dorsal artery of the tongue.
2. Branches from the inferior palatine from the facial.
3. Branches from the superior palatine from the internal maxillary.

The veins empty into the internal jugular. The nerves are, principally, from the glosso-pharyngeal; also branches from the pneumogastric, and possibly also from the spinal accessory (Balme).[2]

The lymphatics will be considered in the description of the minute anatomy.

Anomalies.—But few cases of malformation of the tonsils have been

[1] Anatomie descriptive.

[2] De l'Hypertrophie des Amygdales, Paris, 1888, p. 14.

reported. They may be entirely absent (Salmuth[1]), or, but partially developed, as in a case reported by Gould,[2] in which there was also faulty development of other organs. There may be an accessory tonsil (Jurasz[3] and Claiborne[4]).

The development of the tonsils has been described by Kölliker[5] and Bickel,[6] and more recently exhaustive studies on the embryology of these structures, both human and in animals, have been made by Retterer.[7] According to Retterer, the tonsils develop both from the epiblast and the mesoblast; the lymphoid cells being formed from the epiblast, while the bloodvessels, lymphatics, and connective framework come from the mesoblast.

They first begin to appear in man about the fourth month, and first consist of a collection of small spheroidal cells in the submucosa; at first the collection is diffuse, but gradually becomes more circumscribed. After a time the collection of cells becomes subdivided by numerous connective-tissue septa.

At the fifth month depressions in the mucous membrane begin to appear. These are the crypts, and at first consist of solid plugs of cells dipping down into the submucosa and into the collection of lymphoid cells. Later these become hollow. In the early months the mucous membrane covering the tonsil has a distinct membrana propria, but toward the end of gestation this disappears. At term the tonsils are fully formed.

Histology.

The parts to be described are as follows:

1. The reticulum or stroma.
2. The cells.
3. The bloodvessels, lymphatics, etc.
4. The epithelium.

1. The Reticulum.—The external or attached surface is covered by a layer of fibrous tissue derived from surrounding parts. From this partially investing sheath numerous septa are given off, dividing the tonsil into a series of intercommunicating chambers. The reticulum or framework in which the cells lie closely packed is of two kinds. A, that which is found in the nodules; and B, that which forms the stroma

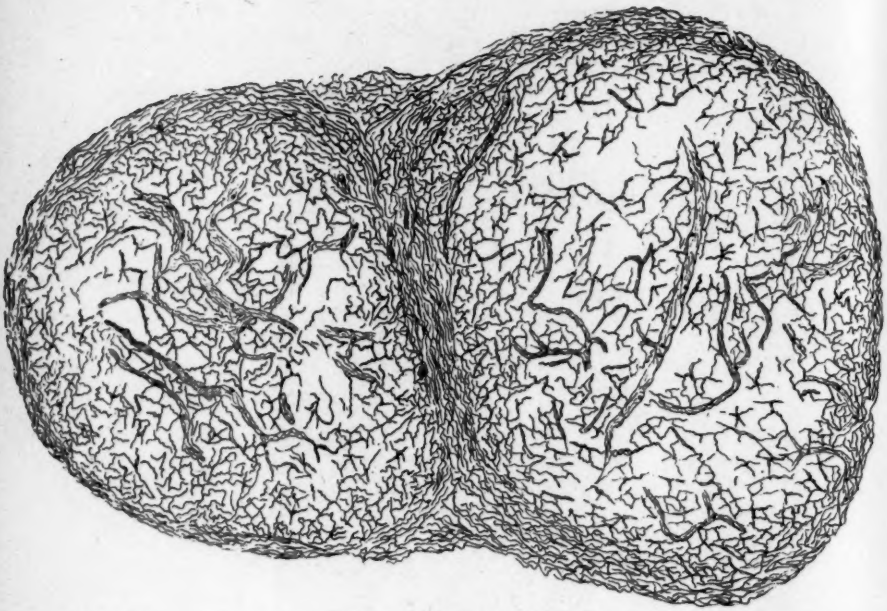
[1] Handb. d. path. Anat., Halle.
[2] Brit. Med. Journ., Oct. 16, 1886.
[3] Monatschrift für Ohrenh., 1885, No. 12.
[4] N. Y. Med. Journ., Feb. 8, 1890.
[5] Embryologie, 1882.
[6] Arch. für path. Anat. und Phys., xcvii. p. 340.
[7] Journ. de l'anat. phys., etc., Paris, 1888, pp. 1–80; also Compt. rend. Soc. de Biol., Paris, 1886, pp. 536 and 581; also vol. iii. p. 27.

FIG. 1.

Drawing from a section of a normal tonsil from a child.

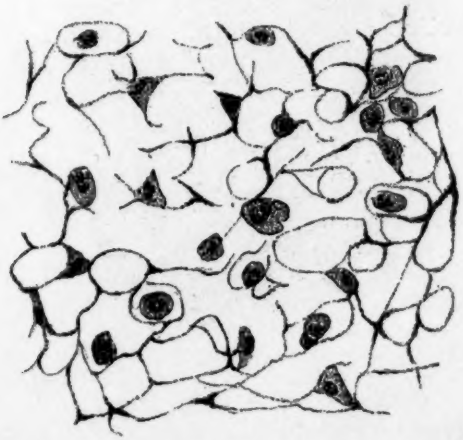
of the tissues between them. (Fig. 2.) The reticular tissue of the nodules is exceedingly fine and delicate. (Fig. 3.) The meshes are lined throughout by endothelium. About the centre the meshes are large and irregular, but toward the periphery they become somewhat

FIG. 2.



A drawing from a section of a normal tonsil from which the cells have been removed, showing the reticulum of two nodules.

FIG. 3.

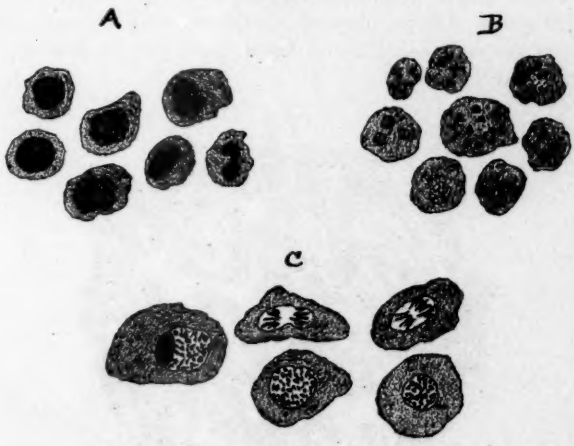


High-power drawing, showing the reticular tissue of a nodule.

coarser and more closely arranged, and finally become merged into the relatively coarser reticulum between the nodules. This form of reticulum contains no connective-tissue cells, and although it is usually described as being composed of connective tissue, it seems more properly to belong to a different variety of tissue. It may be called reticular tissue in contradistinction to the connective-tissue reticulum between the nodules. This last-mentioned form of reticulum differs from that just described, in that it is evidently derived from the fibrous-tissue septa. It is coarser and more closely arranged than the reticular tissue of the nodules, but the meshes are lined by endothelium. About the periphery the varieties merge into one another.

2. THE CELLS.—Three varieties of lymphoid cells, which almost completely fill the reticular network, may be distinguished. (Fig. 4.)

FIG. 4.

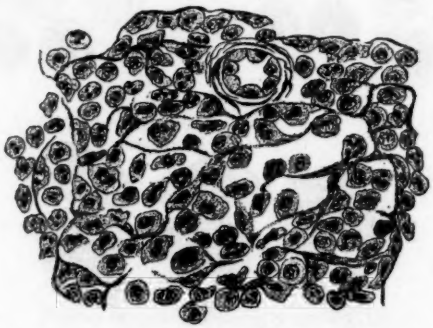


The cells which occupy the reticular network.

A. The majority of the cells are of a spheroidal or irregular shape from 5 to 8 μ in diameter, containing a single nucleus from 2 to 4 μ in diameter. The nuclei are either of a homogeneous or finely-granular character, and occasionally contain vacuoles. No distinct limiting cell-membrane can be detected. B. The cells of this group differ from those of the preceding, in that they are multinuclear. The nuclei vary in number from two to four in a single cell. These closely resemble leucocytes, and the relative number of the two varieties differs a good deal in different sections. As a rule, the mononuclear are vastly more abundant than the polynuclear cells. A large number of specimens were carefully examined with reference to cell-division in these

cells; but none was observed in which karyokinetic figures could be satisfactorily demonstrated. Karyokinesis, in lymphoid cells, is still a much-disputed point among histologists. The studies of Baumgarten[1] and Ribbert[2] seem to confirm those of the writer. On the contrary, Flemming[3] and his pupils Drews[4] and Paulsen,[5] Peremschko,[6] Lavodowski,[7] Stöhr,[8] and others claim to have observed lymphoid cells in the process of indirect cell-division. C. Large, irregular, flat nucleated cells are found in greater or less numbers in the reticular spaces. In these the protoplasm, which is surrounded by an investing membrane, is granular, the nuclei are relatively large, round, or oval, and sometimes contain nucleoli. The intra-nuclear network is distinct, and often karyokinetic figures can be made out. The origin of these cells was for a long time undetermined. It can no longer be doubted that they are derived from the endothelium lining the reticulum. Under normal conditions, but few such cells within the meshes are usually seen; but in diseased conditions, when increased desquamation of the endothelial lining takes place, they become especially numerous. (Fig. 5.)

Fig. 5.



High-power drawing showing the lymphoid cells and the reticular tissue.

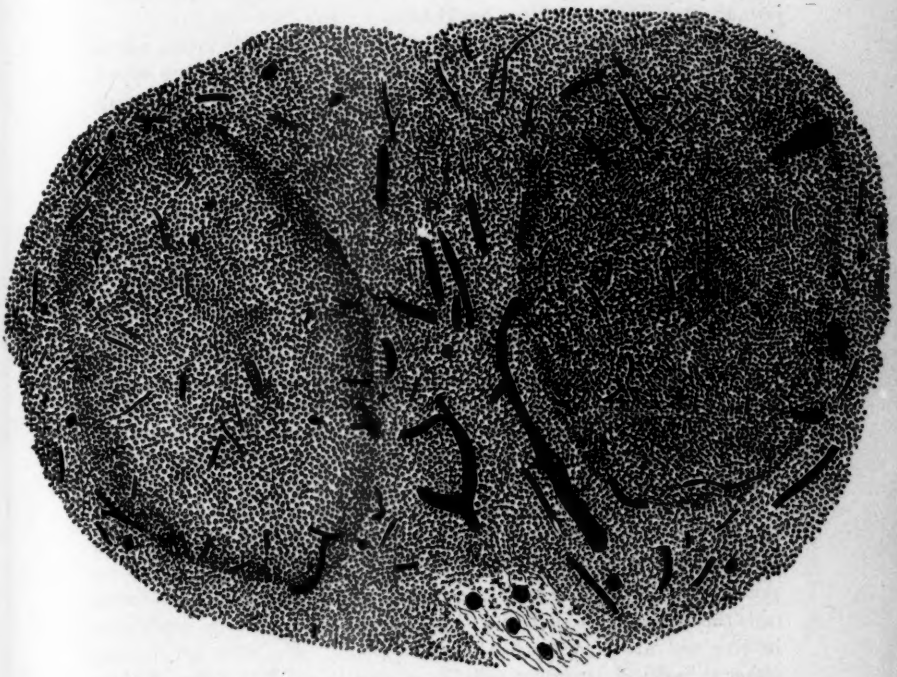
The reticulum forming the framework of the nodules is more closely packed with cells than is that which separates the nodules from one another. Such an arrangement gives to the nodules a denser appearance, but no difference could be detected in the character of the cells

[1] Zeitschr. f. klin. Med., Nos. ix. and x.
[2] Ziegler's Beiträge, 1889, p. 185.
[3] Arch. f. Mik. Anat., Bd. 24.
[4] Ibid., Bd. 24, p. 338.
[5] Ibid , Bd. 24, p. 345.
[6] Ibid., Bd. 17.
[7] Virch. Arch., xcvi.
[8] Ibid., xcvii.; also Ueber die Peripheren Lymphdrüsen, Separat-abdruck aus den Sitzungsberichten in Würtzburg, 1883.

in the nodules from those between them. As was shown by serial sections the nodules are arranged concentrically about the crypts.

3. Bloodvessels (Fig. 6).—The larger trunks after entering the tonsil are surrounded by fibrous tissue sheets derived from the basal capsule. The fibrous tissue about the larger vessels would tend to interfere with their contraction and closure when cut; and this anatomical arrangement seems to afford an explanation for the hæmorrhage which sometimes follows cutting operations involving removal of large

Fig. 6.



Drawing from an injected specimen showing the distribution of the bloodvessels.

parts of the tonsil. The larger trunks rapidly divide into smaller branches, which ramify in the tissue between the nodules. As was shown by injected preparations, the nodules themselves are but scantily supplied with bloodvessels; and these, as a rule, are principally confined to the periphery. Beneath the epithelium in the submucosa the blood is collected in small veins, whence it is returned to the larger veins at the base, and is finally emptied into branches of the internal jugular.

Lymphatics.—Injections of colored gelatin or solutions of nitrate of silver show that the lymphatic network occupies the whole of the tonsillar mass. The lymphatics constitute a series of closed canals in which the lymphoid cells lie, lined by endothelium, and probably they do not open into the reticular connective tissue, either by stomata or open extremities.

From these lymph channels the lymph is collected by several lymph vessels, provided with valves at the base of the organ. These penetrate the basal capsule and connect with the lymphatics at the base of the tongue, which in turn finally enter the lymph nodes at the angle of the jaw, about at the level of the hyoid bone.

Nerves.—The manner of termination of nerve-filaments in the tonsils could not be determined, since repeated attempts to demonstrate nerve-fibres in them failed in each instance. Aside from nerve-filaments supplying the sheaths of bloodvessels, the presence of nerve-fibres has not yet been demonstrated in the other lymphatic structures.

4. Epithelium (Fig. 7).—The tonsil is covered on its free surface by stratified, squamous epithelium, continuous with that of the mouth. In the fully-developed tonsil there is no membrana propria separating the epithelial cells from the underlying tissue. It differs in appearance and arrangement in different parts. In places it presents a uniform layer of from eight to twelve cells in thickness, and is arranged in three layers; the cells of the outermost being flat and scale-like, those of the middle polygonal and "spined," while those of the inner layer are cuboidal in shape. In other parts, while the arrangement of the cells remains the same, the contour is made irregular by projections upward of the submucosa giving an appearance not unlike the rete Malpighii of the skin.

Such is the usual arrangement of the epithelium of mucous membranes in general. The epithelium of the tonsils, however, and also that covering the solitary and agminated lymph nodules of the intestine, present still other appearances, the result of peculiar alterations in the cells themselves. In such situations, the epithelial cells are diminished in size and are very much altered in shape. The cells now become either cylindrical, irregular, spindle- or star-shaped, and many of them are furnished with long, branching processes, which are apparently continuous with the underlying connective-tissue reticulum. Furthermore, little hollow cavities are found in the epithelial layer, usually near the surface. These cavities contain numbers of lymphoid cells and sometimes are closed on all sides; but sometimes they are provided with minute channels leading to the surface, through which lymphoid cells may be seen to pass.

This alteration, which Zawarykin[1] calls a process of "rarefaction of

[1] Zawarykin: Anatom. Anzeiger, 1889, No. 15, p. 467.

the epithelium," seems to be the result of pressure from beneath upon the epithelial lining. It causes a great irregularity in the contour of the

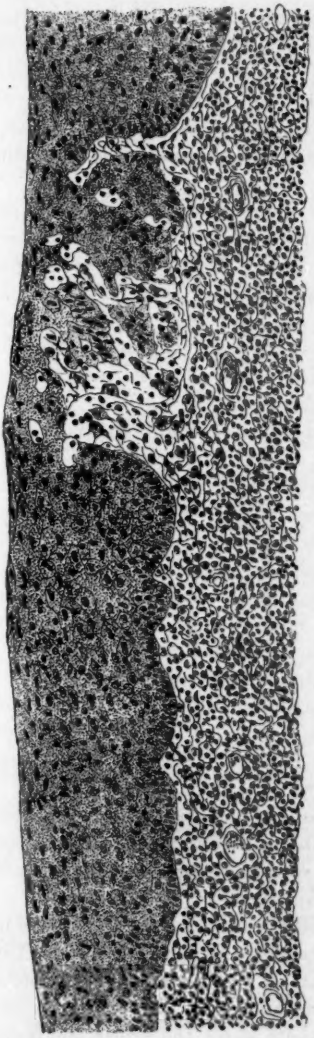


Fig. 7. The epithelium covering the tonsil, showing emigration of lymphoid cells and rarefaction.

Fig. 8. The epithelium covering the tonsil, showing an advanced stage of rarefaction.

epithelial layer, which is also considerably diminished in thickness. In other parts, where these changes have advanced to a still greater degree,

the epithelial covering is so thin as to be but one or two cells in thickness. (Fig. 8.)

"Rarefaction of the epithelium" occurs in both healthy and diseased tonsils. Serial sections show it to be of very irregular distribution; and it has apparently no direct relation with the lymph nodules. As yet its physiological significance has not been made quite clear. It greatly facilitates the passage of lymphoid cells from the tonsil to the cavity of the mouth; and it has, I believe, an important bearing upon the absorption of bacteria and their ptomaïnes, and in the production of certain of the acute infectious diseases.

The crypts penetrate the substance of the tonsil, generally at right angles to the surface, but sometimes more obliquely. Their number varies from eight to fifteen in a single tonsil. Usually they are single, but they may divide into two or more branches. They vary in depth and in the size of their lumina, and are lined by stratified squamous epithelium. The contents of the crypts consist of emigrated lymphoid cells, desquamated epithelium, granular matter, cholesterine crystals, bacteria, and occasionally particles of food.

In almost every section, a varying number of small spheroidal cells are found between the epithelial cells. As long ago as 1836 "emigration of white blood-cells" was described by Valentin.[1] Since then the process has been carefully studied by a great many observers. Stöhr[2] has studied this emigration of leucocytes more especially in the tonsils. In all cases, but more especially in tonsils of young persons, a large number of cells similar in structure to those found in the substance of the organ, are continually finding their way through the epithelial covering to the surface or into the lumina of the crypts.

It will be seen, from the above description of the faucial tonsils, that in structure and in the manner of distribution of the bloodvessels and lymphatics, they closely resemble the agminated lymph nodules or Peyer's patches of the small intestine. Except for the crypts, the structure of the tonsils is, indeed, identical with that of a Peyer's patch.

Comparative Anatomy.—The tonsils of those animals which were examined were found to be of an essentially similar structure as in the human variety; but in the different species a good deal of difference was observed in their shape and gross appearance.

In monkeys the tonsils differ but little, except in size, from those in man. In dogs, the tonsils are relatively large and spindle-shaped. The long diameter is about four times that of the transverse. The dog's tonsil is folded upon itself, so that it presents a deep fissure, on the surface, which extends from either extremity along the upper and outer

[1] Repertorium für Anatomie und Physiologie, 1836, p. 283.
[2] Arch. f. Path. Anat. und Phys., xcviii.

aspect of the organ. Into this fissure most of the crypts empty; the few remaining crypts empty on the free surface.

The tonsils are but little encroached upon by the pillars of the fauces; and they are very thoroughly exposed to view when the mouth is opened and the tongue is forcibly drawn forward. Consequently, these animals are especially applicable for physiological experiments.

In rabbits, the tonsils are hemispherical in shape and present a single crypt at the centre, about which the lymph nodules are arranged in rows.

In cats the tonsils are pear-shaped, and lie in a pocket of fibrous tissue in which they are freely movable. Only a small part of the organ protrudes, through a small circular opening in the mucous membrane, into the mouth.

TECHNIQUE.—Specimens, for histological study, are better preserved when treated with corrosive sublimate solution, than are those which have been hardened, directly, in alcohol or in Müller's fluid. Any of the many formulæ of sublimate solution may be employed, of which Lang's is, perhaps, the best, consisting of water 1000 c.c., corrosive sublimate 8 grm., hydric acetate 8 c.c. Small bits of perfectly fresh tissue are placed in this solution. After one hour they are washed in water, and hardened successively in 40 per cent., 60 per cent., 80 per cent., and in strong alcohol. By means of double imbedding in both celloidin and paraffine, exceedingly thin sections may be cut, which, provided all the sublimate has been removed, stain readily in any of the more commonly employed staining reagents.

The reticulum is best studied in sections from which most of the cells have been removed. This may be accomplished in several ways. The most satisfactory way is to make frozen sections from specimens which have previously been hardened for from one to two hours in one-third alcohol. The sections are gently shaken in a test-tube of water, care being taken not to continue the shaking too long. The sections are stained on a slide and mounted on glycerin. The outlines of lymphoid cells are best preserved by teasing a bit of the fresh tonsil in a mixture of equal parts of osmic acid, 1 per cent., and normal salt solution.

None of the methods of demonstrating the lymphatics of the tonsil are altogether satisfactory. Ranvier's[1] method consists in injecting a small quantity of blue gelatin into the substance of the organ just beneath the epithelium, and allowing the specimen to cool before it is hardened in alcohol, and cut into sections. Solutions of nitrate of silver, 1 : 500, are also recommended in place of the gelatin. While this method is applicable with the lymph nodes, in the case of the tonsil it has, thus far, always been the misfortune of the writer to puncture

[1] D'Histologie. Paris, 1875, p. 674.

some of the smaller bloodvessels with the hypodermic needle, with the result of obtaining a mixed injection. The bloodvessels are easily injected with blue gelatin, artificially through the carotids; or a very good natural injection may be made by suspending the animal before it is killed, by the hind-legs, and hardening the tonsils immediately after they are removed, in strong alcohol.

Physiology.

As has been stated elsewhere, in this paper, our knowledge of the functions of the tonsils is largely theoretical, as nothing seems to have been done thus far by way of experimentation toward the solution of this problem. Indeed, the physiology of the other lymphatic structures, in spite of all the careful research which has been accorded them, is but little understood.

The unsatisfactory state of our knowledge of the functions of the lymph nodes, for example, is well shown by this statement of Foster.[1] "Obviously here, as in the lymphatic follicles of the intestine, the adenoid tissue or lymphatic substance is the seat of an interaction between the blood and the lymph: here the blood gives something to and takes something from the lymph, or, at least, is in some way changed; here the lymph takes from and gives up to the blood. We may be confident that these changes take place, though our knowledge as to the exact nature of these changes is at present very limited."

Studies in pathology indicate that the lymph nodes act as filters. Thus particles of pigment, bacteria, and cells from neoplasms, which have gained access to the lymph channels, are apt to be caught and held in the lymph nodes.

The bronchial lymph nodes succeed, in most cases, in holding back from the general circulation the particles of inhaled pigment which may have been absorbed by the lungs. Living bacteria, or cells from neoplasms, which still have retained vital properties, when they become lodged in the lymph nodes may incite inflammation, or set up new-growths.

It is almost certain that the lymph nodules of the intestines, especially Peyer's patches, are concerned in the absorption of the products of digestion. A certain amount, though but an insignificant proportion of fats, at least, is absorbed by these bodies. (Schäfer.[2])

The functions of the little masses of lymphoid tissue scattered about in the substance of the thoracic and abdominal viscera are totally unknown.

The studies on the physiology of the tonsils, which I have made,

[1] Handbook of Physiology, London, 1889.

[2] Journ. Internat. Anat. und Histol., 1885, Bd. ii. p. 16.

were done, more especially, to determine their relations to some of the acute infectious diseases. Before entering upon a discussion of this subject, it will be necessary to consider some of the theories which have been advanced to explain the functions of these organs.

Perhaps one of the oldest of these theories is, that the tonsils are secreting organs, furnishing a thick, viscid mucus which lubricates the bolus of food during the second part of the act of deglutition, and which also lubricates the back part of the mouth and pharynx.

Such a theory is abundantly discredited on purely anatomical grounds. The secretion of mucus is furnished by the numerous mucous glands in the adjacent mucous membrane, and not by the tonsils themselves.

The old idea of Perrin, that the tonsils were concerned in the formation of the voice, seems highly improbable. A connection between the tonsils and the organs of the genital apparatus has been suggested. This notion is more a popular one, and is without scientific foundation.

More recently Hill,[1] Spicer,[2] and Hingston Fox,[3] reasoning from analogy, have advanced the idea that the tonsils reabsorb the waste secretions of the mouth and pharynx. According to these authors, especially the digestive ferments of saliva are absorbed by the tonsils in order to prevent waste. Although this theory did, at first, seem plausible, no attempt was made to strengthen it by actual demonstration.

The physiological experiments which I shall describe later show Hill's theory of the functions of the tonsils to be wholly unsupported by facts.

Recent observations have shown that pathogenic bacteria may be present in the mouths of healthy individuals, often in considerable numbers, and an intimate connection between the tonsils and some of the acute infectious diseases has long been supposed to exist. Moreover, it was thought not to be unlikely that infection, in some cases, may take place through the tonsils.

In order, if possible, to throw some light on this most important problem, I have endeavored to ascertain the amount of absorption which, under favorable conditions, may take place through the tonsils. Experiments were done on dogs and rabbits. In most cases the experiments were repeated, and as far as possible controls were made in each case. The experiments consisted in attempting to cause the tonsils to absorb various materials which could be afterward recognized, microscopically, in the tissues; and according to the nature of the materials used and the manner in which they were applied, the experiments may be divided into several groups.

[1] British Medical Journal, 1888, vol. ii. p. 615.

[2] Lancet, London, 1888, vol. ii. p. 805.

[3] Journal of Anatomy and Physiology, London, 1885–6, vol. xx. p. 559.

Landois states that under ordinary circumstances absorption from the mucous membrane of the mouth is very slight, although sufficient is absorbed to enable the sense of taste to be perceived, and applications of powerful drugs may be followed by systemic effects. I verified this statement by applying a solution of atropine to the mouth of a healthy person and watching its effect on the eyes. Although the solution employed was a strong one, and the application continued thirty minutes, and the drug was distinctly tasted, no dilatation of the pupils followed.

1. The tonsils of several animals, as well as the whole of their buccal cavities, were kept constantly smeared with olive oil, in one set of experiments; in a second set, melted lard was used, and in still a third, lanolin. After from fifteen to thirty minutes the animals were killed, and the tonsils, together with portions of the tongue and pharyngeal wall of each animal, were hardened in osmic acid one per cent. and alcohol, and examined microscopically. The epithelial covering of the tonsils contained a few fine, black granules (fat droplets), generally near the surface. The granules seemed to be between the cells. There was no fat, either in the lymphoid cells, or lying free between them. Sections of the tongue and pharyngeal wall from each animal showed a few fat globules in the superficial portions of the epithelial covering.

2. Finely-powdered carmine, Berlin-blue, and emery powder suspended in water, were applied to the mouths and tonsils of dogs, in a similar manner as were the fats.

Microscopical examination in each case failed to demonstrate the absorption of any of the insoluble material in the sections of the tonsils, tongue, or pharyngeal wall.

3. Solutions of anilin colors in water, and in normal salt solution, salts of iron, and strong solutions of atropine, were kept in contact with the mucous membrane of the mouth and tonsils for from fifteen minutes to one hour. In none of the experiments in which colored solutions were employed did absorption, as was demonstrated by microscopical examination of frozen sections, take place.

The tissues which were subjected to the action of ferrous sulphate were afterward placed in a solution of ferric cyanide of potassium. Sections of these specimens failed to show granules of Berlin-blue in the epithelium or in the deeper structures. The dogs to whose tonsils strong solutions of atropine were applied, showed no dilatation of the pupils after the application had been continued for one hour.

4. Solutions of anilin colors and mixtures of insoluble carmine in water were injected beneath the mucous membrane in the neighborhood of the tonsils in different animals, which were killed one hour afterward. In neither case was the coloring matter taken up by the tonsils.

5. A small quantity of a strong solution of atropine (one-sixth gr.) was injected into a dog's tonsil immediately beneath the mucous mem-

brane, care being taken that none of the fluid escaped into the œsophagus. Within a few minutes the pupils became widely dilated, and soon afterward the dog became very drowsy, and finally was unable to stand.

6. Small quantities of both soluble and insoluble pigment were injected into the substance of dogs' tonsils, and the animals were killed one hour afterward. Upon examination the pigment was found to have collected in the spaces between the nodules, where the point of the needle was carried. It showed but little tendency to diffusion. None of the pigment had been gotten rid of by the surface or was found within the crypts.

Summary of Absorption Experiments.

The experiments just described were done with care, and, as far as possible, all sources of error were eliminated. The results seem to show that in healthy tonsils under ordinary conditions:

1. Soluble or insoluble materials are not absorbed by the mucous membrane of the mouth, or pharynx, or by the tonsils, except to a very slight extent.

2. It is the epithelial covering which prevents absorption taking place by the tonsils. Substances in solution which have found their way beneath the epithelium may be rapidly taken up by the lymphatics and carried into the general circulation.

3. Soluble and insoluble foreign materials in the tissues in the immediate neighborhood of the tonsils are not readily and at once taken up by them.

4. Soluble and insoluble foreign materials in the substance of the tonsils are not thrown off by the surface; but may either remain in the tissues or may be carried off by the lymphatics to other parts of the body.

Baumgarten has suggested that the tonsils might be the point of entrance of tubercle bacilli into the body; that tubercle bacilli which may have been taken into the mouth may be absorbed by the tonsils, where they may result in the formation of miliary tubercles. From thence, Baumgarten supposes, infection may spread through the lymphatics to the bronchial lymph nodes and finally to the lungs. In order to determine the relative frequency of tubercular lesions of the tonsils, and to ascertain the relationship, if any, of these structures to pulmonary phthisis, I have examined, microscopically, a large number of tonsils (nearly 200) for evidences of tubercular lesions. These tonsils were from persons of all ages; and they include the tonsils from eighteen persons who died of pulmonary phthisis. In but one case out of the entire number examined were the tonsils tubercular. In this case they were removed from the body of a man who died of very general tuberculosis.

From the results of these examinations it would seem probable that:

1. Tubercular tonsillitis is a rare affection.

2. The tonsils are rarely, if ever, the site of primary inoculation in pulmonary tuberculosis.

Whatever may be the physiological significance of rarefaction of the epithelium of the tonsils, it, together with a knowledge of the nature of the lesions of diphtheria of the tonsils, unquestionably affords a ready explanation of the way in which these structures become infected in this disease. We have seen that rarefaction of the epithelium is of constant occurrence in the tonsils; that as a result of this process parts of the epithelial covering are very considerably diminished in thickness, not infrequently so decidedly thinned as to be, in certain places, but one or two cells in thickness. Now, as a result of the presence of the contagium of diphtheria, which acts as an irritant to the cells, increased desquamation of the epithelial covering takes place. This proliferation of the cells, as I have actually observed in sections of diphtheritic tonsils, may entirely denude the tonsil of its epithelial covering in places; and the specific virus of the disease is thus brought into immediate contact with the lymphatics of the tonsils, from whence it is carried into the general circulation.

Recapitulation.

1. The tonsils are lymphoid structures closely resembling the Peyer's patches of the small intestine, consisting in general of a congeries of lymph nodules separated from one another by diffuse lymphoid tissue, which are arranged about several hollow depressions of the epithelial covering, the crypts.

2. None of the theories thus far advanced to explain the functions of the tonsils are conclusive.

3. The tonsils produce no physiological secretion.

4. The tonsils are not absorbing organs. They neither absorb fluids or solid particles from the mouth under ordinary conditions, nor do they take up foreign materials from the tissues in their immediate neighborhood.

5. Tubercular tonsillitis is an uncommon affection.

6. There is no evidence to show that pulmonary tuberculosis ever results from absorption of tubercle bacilli from the mouth through the tonsils.

7. Rarefaction of the epithelium of the tonsils affords a ready explanation of the way in which the contagium of diphtheria may gain entrance to the general circulation in this disease.

New York, March, 1890.

WHY THE SPUTA OF TUBERCULOUS PATIENTS SHOULD BE DESTROYED.

An Observation on the Viability of the Bacilli of Tuberculosis.

By Arthur K. Stone. A.M., M.D.,
surgeon to the boston dispensary.

During the winter of 1886–87 I became interested in the growth and longevity of the tubercle bacillus; from the statement of a Washington gentleman that he had noticed a decided increase in the number of the tubercle bacilli in sputum which had been kept standing at the ordinary room temperature. (This was simply a verbal statement, and to my knowledge has never been published.)

In order to verify this, a number of jars containing tuberculous sputum were set aside and examined after a period of about three months. The result of the examination was as follows:

No. of case.	Date of first examination.	Remarks.	Date of second examination.	Remarks.
XIV.	Jan. 5, 1887	Few found.	April 15, 1887	Same number.
XVII.	Dec. 15, 1886	Small number.	April 15, 1887	Numerous, very numerous, even in masses.
XVIII.	Nov. 17, 1886	None.	April 15, 1887	None.
XIX.	Nov. 19, 1886	None.	April 15, 1887	Numerous.
XXV.	Jan. 5, 1887	Small number; one cover 3, one had only a very few (7 covers).	April 15, 1887	Small number, but easily found in 8 covers.
XXVIII.	Jan. 7, 1887 Cystitis.	Small number.	April 18, 1887	Very few other bacteria, number about the same as in previous examination.
XXIX.	Jan. 10, 1887	None.	April 15, 1887	None.
XXX.	Jan. 19, 1887	Small number in every field.	April 15, 1887	Small number to numerous; very few other bacteria present.

Examination of this table would simply go to prove that for a period of three months the tubercle bacilli remained in sputa retaining their power of taking stain and so presumably alive and virulent.

Case XVII. shows an increase from "small number" to "very numerous." Reference to notes of this case shows that in the examination of Dec. 15th five covers were examined, of which four were marked as "small number" and one "numerous." April 15th eight covers were looked through; two were marked "small number," two "numerous," four "very numerous"; and at the end of the note, "some masses, and where the preparation is well made the bacilli are present in great quantities." But on the whole, I am inclined to believe that the change was simply due to the increased density of the sputum, caused by

evaporation, and to possible carelessness in selection of parts for the first examination.

Case XIX. presents the remarkable statement that no tubercle bacilli were present at the first examination, while they were most easily found in every preparation at the second. The only possibility of error which could have been made in this case arose from the fact that, at the first examination, only four cover-glasses were looked over. The clinical history, as derived from the hospital records, shows that the patient left the hospital with well-marked signs of tuberculosis.

From the winter of 1886–87 until December, 1889, a period of nearly three years, the various specimens of sputa remained upon the laboratory shelves quiet and undisturbed. In the meantime all the aqueous portions had disappeared, and there remained in some cases only a little dry dust about the edges of the glass jars, while in one or two cases there was a hard, dry, brown crust covering the whole bottom of the jar. To prove the presence of the tubercle bacilli, four examinations were made in the following manner:

A drop of distilled water was put upon a cleaned and sterilized cover-glass, and then a bit of the dust or crust removed with a platinum needle rubbed over the cover-glass; usually the crusts would dissolve easily. Any crumbs were removed, the water evaporated, and the specimens stained by Ziehl's method.

No. of case.	Date of first examination.	Remarks.	Date of second examination.	Remarks.
XIV.	Jan. 8, 1887	Few.	Dec. 7, 1889	Very few
XVII.	Dec. 15, 1886	Small number.	Dec. 11, 1889	Small number.
XX.	Feb. 9, 1887	Very numerous.	Dec. 11 1889	Very numerous, long, beaded, or in clumps.
XXIV.	Jan. 5, 1887	Numerous.	Dec. 11, 1889	Numerous.

Practically no other bacteria were present, though usually almost all sputum is especially rich in many forms of bacteria. The bacilli took the stain beautifully, and appeared as bright red as though they had been stained from a fresh specimen.

Having demonstrated the presence of the bacilli in sputa kept for three years, the next thing was to prove their virulence.

December 11, 1889, six rabbits were taken and two were inoculated with a mixture of the sputum dust in sterilized water from each of the following cases: XVII., XX., XXIV. The inoculation was made beneath the skin of the abdomen. At the end of forty days, three of the rabbits were killed, and the result of the autopsies was as follows:

Case XVII.—At the point of inoculation a small tumor two-thirds of an inch in diameter, filled with a white semi-fluid substance, the con-

sistency of very thick cream. Peritoneum, liver, spleen, and lungs normal. Cover-glass preparations were made from the contents of the tumor, and a few tubercle bacilli were found. Sections of the tumor made later showed no tubercle bacilli.

Case XX.—Animal much thinner than when inoculated. A slight thickening was present at the point of inoculation with semi-fluid contents. Peritoneum, spleen, and lungs were normal; liver had several white nodules size of the head of a small pin. Cover-glass preparations from the contents of tumor at point of inoculation showed a few bacilli, though rather questionable in character and not well stained. Section of the liver nodules showed the presence of the coccidia oviformi.

Case XXIV.—Nothing at the point of inoculation. Abdominal cavity more œdematous than usual. Peritoneum, spleen, and lungs were normal. Few white nodules in liver, which showed no tubercle bacilli on section.

The results thus far prove nothing, as the few tubercle bacilli found might have simply been some which were put under the skin at the time of the inoculation in December. The three remaining rabbits were again used and inoculated with the same mixtures as before, but this time the inoculation material was put into the abdominal cavity, the previous experiment having proved that there was no danger of septic infection. The second inoculation took place February 2, 1890, and the rabbits were killed March 28th.

Case XVII.—The seat of the first inoculation showed a small cyst with a few drops of semi-fluid substance, from which cover-glass preparations were made.

On opening the abdominal cavity, a white nodule (1 x 1.5 cm.) was found adherent to the abdominal wall at the point of inoculation. Another large mass lay in, and adherent to, a fold of the larger intestine. Several other smaller nodules were found at various parts of the omentum. Other organs normal. All these nodules had semi-fluid white contents, and of this cover-glass preparations were made with the following results: From the old seat of inoculation, tubercle bacilli lying in clumps of three or four; from mass in side of abdominal wall, four cover-glasses, all showing presence of tubercle bacilli; from the large nodule, several scattered bacilli and one clump of six or eight; from omental nodule, a clump of undoubted bacilli.

Case XX.—Slight cyst at point of old inoculation; cover-glass preparations from the contents were made. No signs of general peritonitis, but adherent to the large intestine and the mesentery were numerous nodules the size of a pea, and having the general appearance of fat. Section, however, showed them to be cystic, and filled with soft, white material from which cover-glass preparations were made. Lungs were normal. The liver contained several small white nodules, which, however, had the appearance of coccidia. Spleen contained one small white nodule. The cover-glass preparations from the cystic growths showed the presence of the tubercle bacilli, few in numbers, but perfectly distinct. Six preparations from the contents of the old inoculation growth all showed the presence of the tubercle bacilli.

CASE XXIV.—All the internal organs were normal. At the point of the first inoculation was a nodule (2 x 2 cm. in diameter). Cover-glass preparations made from the contents showed the presence of a few bacilli. In this case there had always been some doubt whether any of the inoculating fluid had entered the abdominal cavity on account of the leakage of the syringe.

Although the re-inoculation of an animal is a slightly irregular proceeding, yet in this case it is one to which no exception can be taken. The second inoculation simply increased the *dose* of tubercle bacilli, and at the same time put them in a more favorable condition for absorption. The result goes to prove that the bacillus of tuberculosis is not only capable of receiving staining material, when three years old, even though the medium in which they were suspended had been reduced for a period of more than two years to absolute dryness, but that it is also surely alive and virulent. The virulence, to be sure, seems to have been modified by the general drying process, so that the animals were capable of resisting to a much greater degree than usual the poison when introduced.

Another interesting point is in regard to the life-history of the tubercle bacilli. The bacilli, during all the process of drying, had managed to keep their original form and condition, and had not undergone spore-formation. Such, at least, is the fair inference to be drawn from the fact that all other forms of bacteria had disappeared from the sputa dust, while the tubercle bacilli remained and appeared as fresh as though coming from a recent specimen of sputum.

The practical importance of this observation is simply to emphasize the need of the destruction of the sputa of all phthisical patients. The elaborate and painstaking article of Cornet[1] put beyond the shadow of a doubt the fact that a large part of the present widespread tuberculosis was due to the constant exposure of persons who were in a state of low physical condition, or minimum resistance to inoculation with tubercle bacilli to pulverized sputa of tuberculous subjects. Bearing this fact in mind, and adding the results as above obtained, that the dried tuberculous expectorations can remain for a long time—namely, three years—virulent, the practising physician can see the great importance of the destruction of all sputa which may contain the tubercle bacilli.

Experimenters and investigators have all pointed the profession in the same road. There has been no clash, no conflicting statements, and to-day practically everyone agrees to the infectious nature of tuberculosis. But, as Dr. Shakespeare said in closing the discussion on his able paper upon the subject, "What can and should be done to limit the prevalence of tuberculosis in man?"[2]

[1] Zeitschrift für Hygiene, B. v., 1888.

[2] Transactions of the Association of American Physicians, 1890.

"What use was it for Koch to have made his discovery of the infectious nature of the bacillus tuberculosis, if the practitioners of medicine, those who come in direct contact with the people, who are the natural agents for arousing such a public sentiment and enforcement of laws for the protection of public health, utterly neglect to act upon the ample and exact knowledge which we already possess concerning the etiology and prophylaxis of tuberculosis?"

And it may be added that the value of such careful work as that of Cornet and others, and the value of such a single small observation as the one recorded in this paper is entirely lost, if the practising physicians do not set themselves to work to do their part toward eradicating this great public danger.

This is hardly a paper in which to enter into details of how prophylaxis should be carried out, but at the same time a few hints may not be entirely out of place. All rooms which have been occupied by tuberculous persons should be most thoroughly cleansed before allowing them to be used again. As the best means to accomplish the destruction of the sputa, the physician should tell both the patient and the family of the danger which lies hidden in the expectoration. And then he should insist that all the expectoration shall be destroyed. In the houses of the rich, it is very easy to provide the small paper sputa cups which can be burnt, and thus absolutely destroy the bacilli. Poor people can be made to use pieces of newspaper, which can be thrown into the fire and so destroyed. Fire is by all odds the best means for destruction. Corrosive sublimate solutions and carbolic acid require so long a time before they accomplish their work, that usually the cup containing the sputa is emptied before the bacilli are killed. Everyone will grant that if they are emptied into the sewer, their future harmlessness is probably insured, yet as Volsch has found tubercle bacilli after six months in a foul fluid, and as the above experiments show that the resisting power of the tubercle bacilli is very great, it will be safer to rely on fire for the absolute destruction of tuberculosis material.[1]

[1] The above work was done in the Bacteriological Laboratory of the Harvard Medical School, and the paper read before the Massachusetts Medical Society, Suffolk District, Section for Clinical Medicine, Pathology, and Hygiene.

REVIEWS.

A MANUAL AND ATLAS OF MEDICAL OPHTHALMOSCOPY. By W. R. GOWERS, M.D., F.R.S., Fellow of the Royal College of Physicians, Consulting Physician to the University College Hospital, Physician to the National Hospital for the Paralyzed and Epileptic. Third edition, revised throughout with numerous additions and additional illustrations. Edited with the assistance of MARCUS GUNN, M.B., F.R.C.S., Surgeon to the Royal London Ophthalmic Hospital, Moorfields; Ophthalmic Surgeon to the National Hospital for the Paralyzed and Epileptic.

THE first edition of Dr. Gowers's *Manual of Ophthalmoscopy* quickly attained a front rank among standard medical works, a position it always has retained, and now more firmly than ever has secured by the appearance of a third revision, rendered especially valuable by the able assistance of Marcus Gunn. In spite of the fact that this edition contains most of the important new observations which have been recorded since 1881, the bulk of the volume has not been increased. This has been accomplished by rewriting many paragraphs in a more condensed style, and by substituting brief epitomes for the extended descriptions of illustrative cases which appeared in earlier editions. Another important change is the insertion through the text, in connection with the subjects to which they refer, of the microscopic figures which formerly were presented on photo-lithographic plates. An excellent addition is the appendix, devoted to a description of how best to sketch the fundus oculi. This is composed of two portions—in one the method of making a pencil-drawing of the ophthalmoscopic picture is described; in the other most acceptable remarks on the production of colored plates are offered. In addition to the thorough revision which almost every page has received, certain entirely new sections have been added. For example, we find one short article on the ophthalmoscopic changes seen in diseases of the nose—a subject which has recently attracted no little attention. This refers only to the remarkable series of cases of disease of the optic nerve associated with a persistent discharge of watery fluid from one nostril, but might with propriety have included the observations of Ziem and others upon the relations between nasal disease and retinal hyperæmia with limitations in the field of vision. No doubt a subsequent edition will require a paragraph upon "Diseases of the Bones," and a description of Jonathan Hutchinson's types of serpiginous choroiditis seen with osteitis deformans. We much wish that Dr. Gowers had written somewhat upon the ocular manifestations of influenza, in so far as these belong to medical ophthalmoscopy, and given us the benefit of his skill in winnowing the chaff from the wheat.

Occasionally, the work of revision seems not to have included certain

diseases. Chronic rheumatism, according to Dr. Gowers, has only accidental associations with changes in the fundus oculi. Now, while it is perfectly true that many types of inflammation of the optic nerve which have been ascribed to rheumatism are probably not correctly so accredited, it certainly is none the less true that a number of very well authenticated instances of optic neuritis, especially of the monocular type, appear to have originated directly under the influence of this dyscrasia. Parotitis is dismissed in two lines with the statement that transient dimness of sight and coincident congestion of the optic nerve have been described. The observations of Burnett in this disease, while not connected entirely with medical ophthalmoscopy, might well have been summarized. In whooping-cough we miss a reference to the cases of sudden blindness which have been reported by Alexander, and the forms of choroiditis indirectly produced by the paroxysms of coughing in this disease recorded by Nettleship and others. So many recent observations on the influence of malaria and the malarial cachexia in the production of ophthalmoscopic changes in the vitreous, choroid, and retina have appeared, notably the thesis of Lopez y Veita and the paper by Bull, that some reference to them would seem necessary. Dr. Gowers is of the opinion that slight optic neuritis is not very uncommon in chorea. He points out, however, that the frequent presence of hypermetropia would lessen the significance of this appearance in regard to the chorea were it not that the aspect of the disk in all the cases which he has observed has become normal when the chorea subsided. He makes the rather remarkable statement that in all instances of chorea which he has encountered there has been a recognizable degree of hypermetropia. Now while it is perfectly true that the vast majority of choreic children are hypermetropic, in a collection of something like 250 cases of this disease, twenty per cent. of them were found to have refraction other than hypermetropia, that is either myopia, myopic astigmatism, or mixed astigmatism. Dr. Gowers thinks that actual atheroma of the retinal vessels after death has not been found, and that appearances in the retina suggestive of its existence elsewhere are not apparent. If Raehlmann's report is true, in atheroma of the arteries of the body, especially of the cerebral vessels, a form of strangulation occurs in the retinal arteries indicative of this existence.

In a book in which practically everything is good and most of the sections above criticism, it is difficult to point out definitely those portions which seem to have most nearly attained perfection. We are, perhaps, more struck with the judicial care with which the literature of "medical ophthalmoscopy" has been employed than with anything else, and with the fact that while the student always feels after reading on any one topic that he knows Dr. Gowers's own opinion, he has not come into this knowledge by any dogmatic presentation of the theories or of the facts. One of the most comfortable chapters in the book is that on the relation of optic neuritis to encephalic disease. This begins with the first theory put forward by von Graefe, and traces the various new hypotheses and altered hypotheses which from time to time arose by virtue of new discovery and better methods of investigation, and closes this admirable review with the following conclusions:

"That in cases of cerebral tumor evidence of descending inflammation may be traced in sheath or nerve much more commonly than current statements suggest, while in meningitis the evidence of such descending

inflammation is almost invariable. That the resulting papillitis may be and remain slight, or may become intense and present the appearances of mechanical congestion. The causes of this difference we do not know. That such mechanical congestion does not, as a rule, result from the compression of the vessels in or just behind the sclerotic ring, but always, when intense, from compression by inflammatory products in the substance of the papilla. It must not be forgotten that an increase in the size of vessels may be of reflex vasomotor origin, as in all inflamed parts. "That while slow increase of intra-cranial pressure has no effect on the retinal vessels, a sudden increase hinders the escape of blood from the eye for a time, and may intensify a papillitis originating in another way. That distention of the sheath of the nerve alone is probably insufficient to cause papillitis by its mechanical effect, but may, perhaps, intensify the process otherwise set up, especially if the fluid possesses an irritative quality, and if (as Schmidt-Rimpler asserts and Leber denies) it can find its way into the lymphatic spaces of the optic disk."

It is interesting to observe that Dr. Gowers lends the weight of his authority to the use of the term "papillitis," which word, in the opinion of one rather well-known English ophthalmic surgeon, is employed only "by exceptionally bad writers." If Dr. Gowers is an example of the "exceptionally bad writers" who have used this phraseology we wish to cast our fortunes with them.

As year by year improved knowledge and discriminating observation have placed the intelligent use of the ophthalmoscope as an aid in the elucidation of the diagnosis of constitutional diseases upon a higher plane, and the false readings of inexperienced enthusiasts have been subjected to careful revision, in which work the medical world is indebted to no one more than to Dr. Gowers, the subject of ophthalmoscopy has acquired great importance. To anyone who wishes to learn where this science stands, and exactly what relation it bears to medical knowledge as a whole, we recommend this work as by far the best that has appeared in any language. G. E. DE S.

CONTRIBUTION A L'ÉTUDE DES PSOROSPERMOSES CUTANÉES ET DE CERTAINES FORMES DE CANCER-MALADIE DE LA PEAU DITE MALADIE DE PAGET. Par le DR. LOUIS WICKHAM, Ancien Interne en Médecine et en Chirurgie des Hôpitaux de Paris, etc. Pp. 184, avec 4 planches hors texte. Paris: G. Masson, 1890.

A CONTRIBUTION TO THE STUDY OF PSOROSPERMOSIS AND PAGET'S DISEASE. By DR. LOUIS WICKHAM.

THIS admirable monograph is a timely contribution to a theme but recently presented for discussion and as yet but little investigated. The disease first described by Paget in 1874 and still associated with his name (eczema of the nipple and areola, and cancer of the breast, malignant papillary dermatitis of Thin) is one whose history and symptoms are to-day well recognized. Somewhat more than one year ago, however, Darier, of Paris, in a remarkable paper, called the attention of the French Biological Society to the fact that he had recognized, in

what is known among his colleagues as acne cornée (acne sébacée concrète), and also in a cutaneous affection described by him as "vegetative follicular psorospermia," and lastly in Paget's disease of the nipple, a novel parasite. This he recognized as the ovoid unicellular psorosperm, minutely described by Leuckart, and arranged according to Balbini in five separate families under the class of sporozoæ, one family being limited in its habitat to fishes, the others, in different measure, finding their host in different members of the animal kingdom. These animal cysts, well illustrated in the plates added to the treatise before us, were accurately illustrated in Darier's previous contributions to this subject. Special attention was early attracted to the theme in this country, in consequence of the odd circumstance that Prof. J. C. White, of Boston, was present in Paris when Darier's patient was shown, affected with the "vegetative follicular psorospermosis," and the American dermatologist at once recognized the disease as identical with that described by him earlier in the same year as a form of follicular keratosis. At a subsequent date, but yet soon after his return home, the same gentleman had the singular opportunity of reporting the case of another patient with the same disease, in which a careful structural examination was made with a view particularly to the recognition of the parasites figured by the French author. The result was qualified.

The bodies claimed by the French authors cited, also by Mr. J. Hutchinson, Jr., of London, as the effective agents in the production of the diseases named, are recognized without great difficulty. Their morphological characters are distinct. They are ovoid or circular "corpuscles," very clearly defined, having a lucent and somewhat thickened enveloping membrane, wholly unprovided with fibrillæ of attachment to the peripheral elements. In volume they are two and even three times larger than the cells of the epithelium in which they are found lodged, and between which (never within which) they lie. They have a flattened "nucleus" usually pushed to one side of the enclosed mass of protoplasm, and, after the addition of alcohol, exhibit a decided retraction of this protoplasm with the consequent formation of vacuoles between the latter and the enveloping capsule. In the maturer condition the enclosed mass is found to contain numerous granules, which being released on rupture of the capsular wall, escape and are supposed to reproduce the psorosperms after introduction through an abraded stratum corneum into previously healthy tissue. The cysts are so large as to measure at times one-half or one-third of the entire thickness of the rete mucosum in which they are seen.

Cutaneous psorospermosis is thus thought to be a special pathological condition, solely due to the invasion of the integument by the animal parasites described, and existing not merely in Paget's disease of the nipple and breast, and the similar epitheliomatous lesions which have been recognized in the scrotum, but also in certain forms of acne, molluscum sebaceum ("contagiosum," of Bateman), vegetating follicular psorospermia, in White's follicular keratosis, and also probably in other diseases and more particularly in other forms of cancer.

Upon this advanced position, it is proper to state that the scientific world looks to-day with simply respectful consideration. The conscientious work done by the investigators named is worthy of all praise and of future study. But it is yet to be distinctly settled that an epithelial cell may not under special conditions undergo peculiar metamorphoses

with resulting forms which are either identical with or exceedingly difficult to separate from these cyst-like bodies. The failure to reproduce these several diseases by artificial inoculation of the alleged parasites, and the unsatisfactory reports of the results of their culture and of the discovery of a special staining medium have led to a qualified acceptance only of the conclusions here presented.

The genial author of this little monograph may, however, be well congratulated on the fruit of his work. He has not merely given a most creditable report of the whole subject from the special etiological point of view which he and his friends accept, but has furnished us with the best accessible abstract of the literature of Paget's disease of the nipple which has been brought up to date. The plates added, illustrating the gross and microscopical features of the malady, are well reproduced.

His many friends in England and America will be glad to welcome this modest and painstaking contribution to science as the first-fruits of a labor which gives promise of large results. J. N. H.

EPILEPSY: ITS PATHOLOGY AND TREATMENT. An Essay to which was awarded a prize of four thousand francs by the Académie Royale de Médecine de Belgique, December 31, 1889. By HOBART AMORY HARE, M.D. (Univ. Penna.), B.Sc., Clinical Professor of the Diseases of Children and Demonstrator of Therapeutics in the University of Pennsylvania; Physician to St. Agnes Hospital and to the Children's Dispensary of the Children's Hospital; Laureate of the Royal Academy of Medicine in Belgium, of the Medical Society of London; Member of the Association of American Physicians. Pp. 228. Philadelphia and London: F. A. Davis, 1890.

THIS entertaining essay is, we believe, one of nine by this bright and energetic young writer which have received substantial recognition within a short period. Dr. Hare is decidedly to be congratulated on his ability as a prize-taker. That he is an indefatigable worker goes without saying, and he is winning not only monetary prizes, but an enviable name in his special field of work.

The subject is treated systematically in its various aspects—historical, symptomatic, etiological, pathological, and therapeutical. Dr. Hare takes issue with the belief of Gowers that transient post-convulsive paralysis may in certain cases be due to inhibition of the motor centres. Indeed, he is inclined to deal rather severely with this eminent neurologist for maintaining a view which he regards as altogether unnecessary, and entirely without physiological or other foundation. Yet we think that he is wrong; for the transient palsy succeeding a very slight fit, and that following seizures in which a purely sensory discharge replaces motor spasm, are better explained by Gowers's theory, of inhibition, than by that of Todd and Robertson's, of exhaustion. There at least seems nothing unreasonable in the view advanced by Gowers to account for the paresis succeeding a seizure of the latter sort; indeed, it cannot well

be explained otherwise. Gowers states (*Diseases of the Nervous System*, Amer. ed., p. 1089) that "just as such a discharge in the sensory centre may . . . set up secondary discharge in the motor centre, so it may, when slight, merely inhibit the centre." As regards foundation for Dr. Gowers's hypothesis, we think the theory fits in sufficiently well with the facts to render it acceptable. Too little is accurately known of the true nature of inhibition to permit one to attempt to dogmatize on the subject. We personally are inclined to the view of Brunton, that inhibition is not dependent upon the existence of special centres. He regards inhibition and stimulation as relative conditions depending both on the length of path along which the nerve-impulse travels, and its rate of transmission. His hypothesis, which is consistent with known facts, is that nervous stimuli, like those of light and sound, consist of vibrations, and that interference of waves, as in the case of light and sound, inhibit action, while coincidence of waves reinforces stimulation. Gowers's idea of the origin of some forms of post-epileptic paralysis is easily explicable by a consideration of Brunton's hypothesis.

We find nothing in the character of the syphilitic headache accompanying luetic epilepsy, described by Dr. Hare, which may not also be present in the cephalalgia attending lead-convulsions, although he is inclined to the belief that the symptoms are more or less peculiar to cerebral syphilis. Tanquerel described a quite identical headache preceding the outbreak of lead-epilepsy, and the reviewer has notes of cases presenting similar phenomena. This point is noted because cases of lead-convulsions occurring in this city, and presumably elsewhere, have more than once been mistaken for both specific and ordinary epilepsy. The reviewer must take exception also to the statement first made by Dowse, and now insisted upon by Hare, that "epileptic attacks beginning after thirty years of age are almost surely syphilitic, particularly if no history of traumatism or heredity is present." Fortunately, lead-convulsions are not of very frequent occurrence, so mistakes are not often apt to arise; yet, perhaps, because of their rarity, and certainly because of their obscurity (often as regards origin and prodromata) it is well to be mindful that they may occur at any age, and in those whose occupation does not expose them to the metal.

Discussing the influence of traumatism on the etiology of epilepsy, Dr. Hare urges that the greatest care be exercised in our decision as to the causative factor, so that we be not misled by a mere history of an injury into a *post hoc ergo propter hoc* opinion. He recognizes that cerebral injury may induce epilepsy, and yet, it seems to us, fails to lay sufficient stress on the well-known fact that even though the primary causative factor of epilepsy be removed, whether it be in a peripheral part, or central consisting of a depressed fragment of bone, the convulsions may still continue through a state of chronic high instability of certain cells having been set up by the irritant which does not disappear with the removal of the latter. This condition of affairs may be present even though no inherited tendency to cerebral disorder exists. Bearing on this, Dr. Hare states (p. 95): "Naturally, if two cases have a history of cerebral injury, and both are epileptic, one is apt to think that the same cause is at work in both instances, but in reality no proof exists that such is the case. In one individual, elevation of a depressed fragment of bone may result in a cure; in the other, even though a depression exists, and is removed, no benefit may be reached, because in the

period between the reception of the injury and the first fit the man has contracted syphilis, which has produced epilepsy under the cloak of traumatism, and which is only relieved by mercury and the iodides, or he has a constitutional inherited tendency to epilepsy, aside from any extraneous causes." The convulsions might still have continued in the second case, after the removal of the depressed fragment of bone, and yet the epilepsy have been originated by the traumatism; the same might hold good had the fits had a luetic cause and careful anti-syphilitic treatment had been instituted. As Hughlings-Jackson expressed it, a syphilitic lesion may *cause the cause* of the fits, and this latter cause (probably high instability of cells in the vicinity of the original lesion), not being specific, may continue after the removal of all cerebral evidences of syphilis.

Through an oversight, perhaps, the dose of dilute hydrobromic acid, mentioned in the chapter devoted to the treatment of epilepsy, is considerably larger than that usually prescribed: one-half a fluidounce to one fluidounce, in place of one-half to one drachm. Nickel bromide, too, should scarcely be given in the same dose as potassium bromide. From five to ten grains is the ordinary dose of this salt of nickel, while that of potassium bromide is, of course, much larger.

In concluding these few criticisms we would say that the book is an excellent *résumé*, treated in a painstaking and thorough manner. We cordially recommend it to those interested in the subject.

D. D. S.

HYGIENE AND PUBLIC HEALTH. By LOUIS C. PARKES, M.D., D.P.H. Lond. Univ., Assistant Professor of Hygiene and Public Health at University College, London. With Illustrations. Pp. 485. Philadelphia: P. Blakiston, Son & Co., 1890.

THE second edition of this practical, plainly-written, elementary work on hygiene follows closely upon the first issue. The author must be congratulated upon the success of his efforts to interest the practising profession upon so important and vital a subject. It is remarkable to note how rapidly the question of hygiene is absorbing the attention both of the medical profession and the laity, and although there has not elapsed a sufficient time to allow of very important additions to the mass of sanitary knowledge already presented to his readers, Dr. Parkes is able to supplement the information already given with fresh facts and new tables.

It will be advisable to devote some space to the quotation of the new data and paragraphs, and thus enable the reader to judge for himself, viz.:

"There is also some evidence to show that leaden water-pipes are much more rapidly corroded when the mains are intermittently charged than when kept under constant high pressure."

In speaking of magnetic carbide of iron as a filtering substance, the following paragraph has been added: "A very similar material called polarite has lately come into use. It contains about fifty per cent. of magnetic oxide and carbide of iron combined with other insoluble mineral matters, and is capable of producing equally good results."

Sewage: "Another deodorizing method recently introduced is that known as the 'Amines' process. The sewage is treated with milk of lime and with a small quantity of herring-brine, which contains a certain percentage of the compound ammonia termed methylamine. This substance acts as a deodorant and antiseptic, and is said to sterilize the effluent completely, so that it undergoes no secondary fermentation, whilst the sludge is so far deodorized that it can be dried in pits exposed to the air, or of a drying kiln, without giving rise to noxious effluvia."

Air and Ventilation: "A new explosive termed roburite has been lately introduced into some Lancashire collieries. It is a mixture of nitro-benzines and ammonium nitrate. Several cases of poisoning, however, have occurred amongst the miners, both from handling the cartridges and from breathing the fumes after explosion."

Soils: "Another common cause of damp walls is defective gutters to the roof, or broken or otherwise damaged rain-water pipes."

Mineral waters are referred to with a few words of warning. A case is given of a water described as the purest water in the world. It was found to contain an excess of organic matter and floating particles, which on microscopical examination were discovered to consist of masses of fungi and bacteria, besides being impregnated with sulphuretted hydrogen.

Contagia: "Quite recently mice have been rendered immune against anthrax virus by injection of an albumose isolated from cultures of the anthrax bacilli."

A mere reference is made to chemical vaccination.

A table of weights and measures is also added.

It will be seen from the above quotations that, while no new discoveries of the first importance are to be found in this second edition, nevertheless Dr. Parkes is able to present his readers with some new and interesting facts, and thus keep them *au courant* with the history of this great subject, which can hardly yet be said to have emerged from its infancy. S. G. D.

THE ESSENTIALS OF MEDICAL CHEMISTRY AND URINALYSIS. By SAM E. WOODY, A.M., M.D., etc. Third edition. Philadelphia: P. Blakiston, Son & Co., 1890.

THE fact that Prof. Woody's little book has reached a third edition in such a short time is sufficient proof of its usefulness for, and demand by, the medical student. The selection of the material and its plan of presentation resulting from the author's large experience as a practitioner and teacher of medical chemistry is well intended to offer to the student that which is really essential for his limited college course, and it is to be hoped, a basis for further instruction in this important branch of medical science.

While we might hint at the superfluous elucidation of strictly-technical processes, and the reappearance of the publishers' much-used cuts from all their other chemical works, such as refining sulphur, making reduced iron, etc., we can but congratulate the author on his additions in organic chemistry and urinalysis, and bespeak for his little work the attention of medical students and practitioners. L. W.

MINERAL SPRINGS AND HEALTH RESORTS OF CALIFORNIA, WITH A COMPLETE CHEMICAL ANALYSIS OF EVERY IMPORTANT MINERAL WATER IN THE WORLD. Illustrated by WINSLOW ANDERSON, M.D., Joint Editor and Publisher of the Pacific Medical Journal, etc. Pp. 384. San Francisco: The Bancroft Company, 1890.

THE groundwork of this contribution to our knowledge of balneotherapy and the scientific internal administration of mineral waters was presented to the Medical Society of the State of California, April 20, 1889, and awarded the annual prize of the Society.

The work contains the names of over two hundred California Springs, with about one hundred analyses, and two hundred analyses of all the famous springs in America and abroad. Many of the analyses are by the author and show careful, painstaking work, extending over many years; the result is alphabetically arranged, which greatly aids in the convenience of reference. The surrounding locality of each spring is carefully described; the route of travel and the accommodations that an invalid may expect to find at the end of his journey for health are also considered;—and what can be more essential for the invalid's well-being than pleasant and attractive surroundings?

The vast expanse of territory known as the States of the Pacific Coast is remarkable for the number of its mineral springs, more particularly the hot and warm springs. Of these States, California stands at the head of the list; indeed, it is probable that this State has more known springs than any other State in the Union, east or west; but, on account of the enormous size of the State, and the fact that many localities are as yet almost unsettled, it is impossible in many instances to obtain complete reports.

The springs may be classified as sulphuretted, carbonated, alkaline, saline, chalybeate, and acid. As one would suppose, a large number of the springs are thermal, as over a large area of the State a volcanic rock-formation exists, with which these springs are usually associated. It must be borne in mind that the springs of Southern California are situated in a country whose climate has few equals in the world, and is surpassed by none, so that here the health-seeker may spend day after day, from sunrise to sunset, in the open air and derive all the benefits from such an existence totally independent of any medicinal constituents that the waters may contain. In the selection of localities to which physicians may recommend their patients, sufficient importance has not in the past been attached to the environment, and too much weight has been given to the particular number of grains per gallon in the water to be used.

W. A. E.

PROGRESS

OF

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

FRANCIS H. WILLIAMS, M.D.,
ASSISTANT PROFESSOR OF THERAPEUTICS IN HARVARD UNIVERSITY.

An Addition to the Therapeutics of Epilepsy.

Almost countless drugs and combinations of drugs have been used in the treatment of epilepsy, with the result that the various bromides, either singly or combined, have so far given the best results in relieving this distressing disease. Dr. Charles S. Potts has sought some drug which would be equally efficacious in lessening the number of epileptic seizures and at the same time not cause the disagreeable symptoms which may follow the persistent use of the bromides. With this end in view various drugs, as antipyrine, antifebrin, and bromide of ammonium were separately tried, but with indifferent results until Dr. H. C. Wood suggested the use of antipyrine and bromide of ammonium in combination. Since then this mixture has been used with excellent results in the treatment of forty-three cases of idiopathic epilepsy. In none did it fail to cause marked amelioration of the symptoms, and in some it gave relief when all the other commonly-used remedies had failed, and in none has there been any indication of bromism, or of the disagreeable symptoms to which antipyrine sometimes gives rise.

For adults the dose, which is given three times a day, contains six grains of antipyrine and twenty grains of bromide of ammonium.—*University Medical Magazine*, No. 1, vol. iii., 1890.

Anæsthetics in Natural Labor.

Dr. Chaigneau has recently made a comparative study of the different anæsthetics which are employed in parturition. Although these agents are very numerous, attention need only be directed toward chloroform, chloral, antipyrine, and cocaine, as they are about the only ones given which it is warrantable to employ under these circumstances. Antipyrine, the author

shows, has given only moderately satisfactory results; while it possesses many advantages, yet the inconvenience of requiring large doses, which are apt to prove irritating to the stomach and intestine, detracts from its value. Chloroform, on the contrary, in the author's opinion, possesses so many advantages that it is surprising that it is not more frequently employed. He claims that it has no action on the delivery or on the production of post-partum hæmorrhages, or on any of the conditions of the puerperal state. He maintains that it is indicated in all cases where suffering is excessive, where the contractions of the uterus are spasmodic, or where there is a spasmodic contraction of the cervix, where there is placental retention from uterine contraction, or where there is a rigid perineum. The only contra-indication to the use of chloroform is chloro-anæmia, with a tendency to syncope. He even maintains that acute or chronic pulmonary affections, diseases of the heart, kidneys, or of the nervous system need not interfere with the cautious administration of this anæsthetic.

Cocaine has been but little employed in such conditions. It may, however, serve to render great service in diminishing the pains which attend the passage of the head through the vagino-vulvar canal. The best results can be obtained with a five-per-cent. solution, which may be administered upon cotton tampons, allowed to remain for a few minutes, and then replaced by others. Such a procedure is even stated to accelerate labor, as, the suffering being less, the voluntary assistance rendered by the patient contributes toward hastening the termination; or, a four-per-cent. ointment may be employed, also with apparently equally satisfactory results. It should be noted, however, that sublimate injections should not be employed simultaneously, as through their action the alkaloid is decomposed and its properties are thus lost. Finally, reference is made to subcutaneous injections eight or ten minutes before the expulsion of the head. These injections may be made directly under the labia, and prevent the violent pains which generally attend the passage of the head.—*Therapeutic Gazette*, No. 11, 1890.

Experiments upon the Action of Chloroform and Ether.

The conclusions of Professor MacWilliam, of Aberdeen, in his report to the committee of the British Medical Association, are the result of a long and elaborate investigation in which a novel method of studying the heart and vascular system was used. From his work it seems that during chloroform anæsthesia the blood-pressure is lowered and the heart's action is weakened. Thus chloroform exerts a direct influence on the heart—depressing its energy, diminishing its tone, and dilating its chambers. Such dilatation of the heart occurs to an appreciable extent even when chloroform is administered gently, mixed with abundance of air, less than four per cent., and may occur even before the conjunctival reflex is abolished. The dilatation affects all parts of the heart, more or less, and is not due to the accompanying fall of pressure from action on the vasomotor centres, or to the diminished blood-supply through the coronary arteries. Under chloroform, dilatation often occurs very quickly, before there is any fall of pressure.

There is no distinct change in the rate of the heart's action when dilatation occurs. A sudden and complete cessation of the cardiac rhythm is never

caused by the inhalation of chloroform. Cardiac failure occurs by a more or less sudden enfeeblement and dilatation of the organ, not by a sudden, complete cessation of rhythm.

Cardiac failure sometimes occurs in this way a considerable time before the respiration stops, though generally the respiration stops before the heart has become incapacitated, and the failure of artificial respiration to bring about recovery, in some cases of chloroform collapse, is in all probability due mainly to the enfeebled and distended state of the heart, which has become unable to maintain the circulation.

The contrast between the relation to the heart's action of chloroform and ether in anæsthetic doses is very marked. With ether, the induction of anæsthesia with complete abolition of the conjunctival reflex has not been attended by any noteworthy dilatation; indeed, effects of a stimulating character have sometimes been observed.

Changes in the respiration exert a most important influence upon the effects of chloroform administration. An amount of chloroform which can be given with safety during easy breathing may speedily become dangerous during deep, rapid respiration; further free dilution of chloroform with air, the restriction of the percentage of chloroform vapor to four or four and one-half per cent. gives no security against an overdose. A percentage that gives safe anæsthesia during ordinary breathing may lead to fatal collapse if given during exaggerated respiration.

It is suggested that in case of fall in blood-pressure that this condition may be somewhat counteracted, in the upper portions of the body, by pressure upon the abdomen over the aorta.—*British Medical Journal*, No. 1556, 1890.

Treatment of Ingrown Nail.

Dr. Pürckhauer moistens the surface of the diseased nail with a lukewarm forty-per-cent. solution of caustic potash, and then scrapes off the softened upper layers with a sharp-edged piece of glass. After a second application of the potash solution the scraping is continued until the nail is as thin as a sheet of paper. It is then lifted up from the soft parts with forceps, and the diseased parts are excised.—*Therapeutic Gazette*, No. 11, 1890.

Preparation of Saccharin.

R.—Saccharin	. . . . .	150 grains.
Bicarbonate of soda	. . . . .	75 "
Distilled water	. . . . .	Oij

One part of this solution is equivalent to two and one-half times as much sugar.—*Nouveaux Remèdes*, No. 19, 1890.

Chloroform and Phthisis.

Dr. Samuel O. Potter reports that he has discovered a cure for tuberculosis in the almost continuous inhalation of chloroform. As a result of some experiments he feels convinced that this bacillus may be destroyed, and its victims saved, by the continuous use of chloroform inhalation, systemati-

cally carried on, day by day, by means of suitable apparatus, and with the care necessary to prevent injurious results or accidental poisoning. It is not necessary to induce anæsthetic action, but the inhalation can be kept up continuously for several hours daily, and maintained short of general anæsthesia. —*New York Medical Record*, November 1, 1890.

Treatment of Dysentery.

Dr. H. A. Fairbairn calls attention again to the advantages of irrigation of the large intestine and the thorough flushing of its contents. In the early stages the walls of the intestine are not liable to be weakened by deep ulcerations. The amount of fluid which may be safely used is three or four pints, since the capacity of the large intestine, as a rule, is about six pints. The temperature of the water, which should have been boiled or distilled, should be about 100° or 105° F., except, possibly, in the first or second administration, when quite a low temperature appears of benefit. The patients are confined to bed, are deprived as much as possible of food, except whiskey well diluted. Peptonized milk in very small quantities, not more than a quart in twenty-four hours. If the patient will take no food for forty-eight hours it is a great advantage.

The liquid preparations of beef, with their concentrated salts, are apt to be irritating. Eggs, scraped beef, or, when these are objected to, steak, roast and chop, with bread, make up the dietary.

A cathartic may be administered at the beginning of the case. If there be nausea, calomel in small and frequently-repeated doses is the drug chosen, otherwise sulphate of magnesium. Salol is then ordered, and opium in some form if the pain demands. Naphthalin and corrosive sublimate may also be employed.—*Brooklyn Medical Journal*, No. 10, 1890.

Epsom Salts in the Treatment of Acute Dysentery.

Powdered ipecac is the remedy which is most frequently used in the treatment of acute dysentery, and in India large doses of it are considered the best method of attacking the disease.

There are, however, objections to be raised against the administration of large doses of ipecac in this disease. Its influence is depressing, and this action is promoted by the nausea and vomiting, and, further, the vomiting may become uncontrollable.

The disease is one which is accompanied by much nervous depression, which it is important not to increase.

After observing a number of cases in which there were marked depressing effects from ipecacuanha, Dr. A. W. Leahy began treating cases of acute dysentery with a saturated solution of sulphate of magnesium, following a recommendation of Bartholow's, who regards the administration of sulphate of magnesium as the most efficient treatment of this disease, particularly in the acute stage.

Dr. Leahy gives a table of nearly one hundred cases treated at Hyderabad among the poorer class of patients, the vitality of many of whom was at an exceedingly low ebb when they came under treatment. Out of ninety-five,

three died; two out of these three cases were stated to have been in a moribund condition at the time of their admission to the hospital. It appears that, on an average, two day's treatment with Epsom salts is required to produce disappearance of dysenteric symptoms. The treatment subsequent to the production of this condition consists of an astringent mixture, with opium. The method of administration is to take a sufficient quantity of sulphate of magnesium to saturate seven fluidounces of water, and to this saturated solution add one ounce of diluted sulphuric acid. The dose of this is a tablespoonful every hour or two in a wineglassful of water until it operates. Sulphate of morphine may be combined with it, or starch enemata with laudanum may be employed.

Dr. Leahy claims that in the earlier stages of dysentery this saturated solution of Epsom salts acts like a charm; fever, if present, disappears; mucus and blood are wanting in the stools, which become copious, feculent, and bilious; the tenesmus ceases; the patient's anxiety diminishes; the skin acts well, and sleep follows the administration of the first few doses. It is especially in acute cases that sulphate of magnesium is so valuable; the more chronic the case becomes, the less apparent are the advantages of this method of treatment. Dr. Leahy has ordinarily given a drachm of this saturated solution with ten drops of dilute sulphuric acid every hour or two until its effects became evidenced in the feculent character of the stools and their freedom from blood and mucus, or until the temperature has fallen, and the pain and tenesmus have ceased. When the stools have become normal in color and appearance, and the patient only passes two or three in the twenty-four hours, an ordinary astringent mixture of acid with laudanum or tincture of Indian hemp, or a pill containing extract of opium, is usually all that is necessary to complete the cure. It is, of course, imperative to diet the patient with great care.

This treatment Dr. Leahy compares with that by ipecacuanha as follows: It has no depressing action on the system, it neither produces nausea nor vomiting; it quiets and soothes the patient.

In twenty-seven cases of acute dysentery among Europeans all were successfully cured.

It is peculiarly in acute dysentery that the saturated solution of sulphate of magnesium will yield such excellent results. The more chronic the case the less likely is the remedy to prove of value.—*Lancet*, No. 3501, 1890.

Sulphonal in Diabetes.

Dr. V. Casarelli has used sulphonal in diabetes with the following results:

Sulphonal exerts a favorable influence upon the chief symptoms of diabetes, diminishing the quantity of sugar, also the polyuria and polydipsia.

These results are obtained in a moderate degree by a dose of 15 to 30 grains *pro die*. They are more marked with a dose of 45 grains, which may be given for several days; 30 grains is well borne for a longer time, 45 grains creates no disturbance at first, but if persisted in for a time produces dizziness and excessive somnolence, which disappear upon the reduction of the dose.

The favorable effects of sulphonal are as evident with a mixed diet as with

a strict meat diet; in the latter sugar was found in great quantity in the urine after sulphonal had been suspended.

In the same cases antipyrine was tried before sulphonal, but the effect produced by antipyrine was less marked than that by sulphonal.—*Medicinische-Chirurgische Rundschau*, Heft 20, 1890.

MEDICINE.

UNDER THE CHARGE OF

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The Secretion of Hydrochloric Acid in the Stomach during Digestion.

V. Jaksch (*Zeitschr. f. klin. Med.*, B. 17, H. 5, 383) has devoted his attention to the determination of the exact amount of hydrochloric acid present during different periods of digestion. He describes the method of analysis which he employs, and which consists in a modification of that of Sjogvist's. This is a gravimetric method, in which the hydrochloric acid is caused to unite with barium, and the barium then recovered in the form of the sulphate and weighed.

A series of experiments were performed on each of a number of children who presented no disturbances of digestion. A definite amount of nourishment was administered in the morning on an empty stomach, and the contents of the stomach later removed by the method of expression after the lapse of intervals of time varying one-quarter of an hour in the different experiments. The amount of hydrochloric acid present in 10 c. c. of the unfiltered gastric contents was in each instance determined; the author having found that the filtered contents lost considerably in the amount of acid. He details his observations proving this loss.

Series of observations were made by administering respectively boiled ham, boiled milk, and purely hydrocarbonaceous food. All the experiments are reported in full.

The principal results of these studies are the following:

1. Within one-quarter of an hour after the administration of nourishment the stomach has produced an appreciable quantity of hydrochloric acid, and this amount increases until it reaches its maximum from one to three hours after food is taken.

2. The secretion of the acid does not constantly increase, but may, after one and a quarter to two hours, show intermissions.

3. The amount secreted increases most rapidly after the ingestion of flesh; more slowly after milk. This is doubtless due to the property milk has of forming compounds with hydrochloric acid; and this fact also explains the

small amount of free acid found in the stomach of nursing children. The amount of acid increases most slowly after the ingestion of hydrocarbons, though its increase during the first quarter of an hour is most rapid after this form of food.

4. The highest average amount of acid in the gastric excretion was found after a milk diet, and equalled 0.1615 gramme in 100 c.c. gastric contents. After a flesh diet the average amount equalled 0.1563, and after hydrocarbons 0.1102.

5. Digestion appeared to be more rapidly completed after the ingestion of small amounts of flesh; next rapidly after hydrocarbons, and least so after milk.

The author points out how these results may be of value as regards both the physiology and pathology of digestion. From the last point of view he considers that the absence of free acid after one to three hours after flesh or milk has been eaten renders it very probable that there exists some severe disturbance of the gastric function; while no such conclusion can be positively drawn after a diet of carbohydrates. Further, that large amounts of free hydrochloric acid found as long as two to three hours after eating flesh or milk do not indicate a hypersecretion. A milk diet is not to be recommended in the pursuit of studies upon digestion.

In a second part of the author's article he has endeavored to determine the relative sensitiveness of some of the different color-tests for free acid in the gastric secretion. It appears that Congo paper and benzopurpurin have about the same value, but that the Günzburg reaction is by far the most delicate of all the color-tests. All of them are, however, inexact, and not reliable for scientific purposes.

Still a third series of experiments was carried out to determine the amount of hydrochloric acid secreted by sick children under different conditions.

The most important results were:

1. That the quantity of acid found one hour after the ingestion of nitrogenous food depends upon the age and weight of the child.

2. That great variations are witnessed under pathological conditions, but that catarrhal conditions of the stomach, dyspepsia, etc., lead to a diminution in the acid secretion.

The author also tested the value of the administration of weak tea and saccharin as an excitant to gastric secretion, but found that, although hydrochloric acid could usually be detected after three-quarters of an hour, yet it was sometimes entirely absent, and was always much less than after the ingestion of nourishing substances.

The Diagnosis of Abscess of the Liver.

Pel (*Berlin. klin. Wochenschr.*, 1890, 34, 765) read a paper on this subject before the International Medical Congress, in which he gives the result of his observations on twenty-five cases of solitary liver abscess, of size sufficient to admit of a diagnosis being made during life. Only one of these occurred in a woman.

In many cases an abscess of the liver cannot be detected, either because

it produces no symptoms whatever, or because it is too small or too centrally situated to be recognized with any certainty.

The clinical diagnosis of an abscess of the liver depends principally on three factors: 1. Objective symptoms. 2. Subjective symptoms. 3. The etiology.

Of the *objective symptoms*, the enlargement of the liver is a sign never absent in cases capable of being diagnosticated. Yet this enlargement has three characteristic peculiarities which, together, are of almost pathognomonic significance: (*a*) The liver is enlarged chiefly in an upward direction, so that the right lobe pushes the diaphragm upward into the right thoracic cavity. Enlargement of the liver downward and to the left, though usually present also, has but little diagnostic significance. (*b*) The second peculiarity, the more or less, though usually slight, convex form of the upper line of liver-dulness, is a very valuable sign of liver abscess. This convexity may occur at any part of the perimeter of this boundary. (*c*) A third characteristic of the enlargement is that the hepatic-pulmonary percussion boundary which has been displaced upward, and which should in normal conditions be movable through respiration or by lying on the side, is now very little or not at all so. This sign should be looked for very carefully in order to distinguish abscess from a hyperplastic or pseudo-leukæmic liver. This lack of motion is due partly to the formation of adhesions, partly to the fact that the right half of the diaphragm moves less on account of pain, and partly to the resistance which the suspensory ligaments offer to the depression of the organ.

Frequently, with the high position of the diaphragm, there are also present the symptoms of compression or relaxation of the lungs, and care must be taken not to suppose a liver abscess to be a pleural effusion.

Several other objective symptoms may be noticed on inspection. A not inconsiderable distention of the right hypochondrium and the hepatic region, with diminished motion on respiration and widened intercostal spaces, occurring in a man of cachectic appearance and of middle age arouses the suspicion that there exists a collection of pus in the liver. When collateral œdema or a fluctuating tumor is also to be felt in the intercostal spaces or in the epigastrium, no one can fail of a diagnosis.

Further objective symptoms are the suffering, apathetic appearance of the patient, who is evidently very ill; the dull eye, weak pulse, anæmic murmurs, hectic fever. The feet are not infrequently œdematous.

Very considerable dyspnœa increasing on exercise, cough with or without expectoration, and pain and a sense of tension in the side are rarely absent. If in addition to these there is a phthisical habitus and history, and particularly if there is also some slight alteration in one apex, one may be led to make the mistaken diagnosis of tuberculosis. The author has seen the bloody expectoration, occurring after the rupture of a liver abscess into the lungs, mistaken for the hæmoptysis of pulmonary disease.

Icterus was observed in none of the author's cases.

Of the *subjective symptoms*, the pain already referred to may be mentioned as the most constant. It occurs in the hepatic region or in the back, or sometimes in the breast or gastric region, and it often radiates toward the posterior aspect of the right shoulder. It is increased by pressure, and in the latter stages of the disease is very severe.

Finally, the *etiology* is to be considered. The fact that the patient has suffered from tropical dysentery, or even that he has lived in warm climates, may give occasion to the development of an hepatic abscess. Of the cases occurring in temperate regions there may be various etiological factors, such as gall-stone, inflammation in the region of the portal vein, suppuration of echinococcus cysts, metastatic suppuration of the liver, and trauma. But in eight of the author's cases no cause at all could be found.

As regards differential diagnosis, the affection is most frequently confounded with tuberculosis. It must also be distinguished from malaria, pseudo-leukæmic infiltration of the liver, biliary colic with subsequent intermittent fever, syphilis of the liver with or without the formation of gummata, soft neoplasms, deeply situated phlegmonous inflammation of the abdominal walls, encysted pleural effusions, and sub-diaphragmatic collections of pus.

It is especially difficult to determine whether a collection of pus is in the convex portion of the liver or between the liver and the diaphragm, or is an encysted empyema. It is to be noted, in this connection—1, that sub-phrenic abscess almost always gives physical evidences of containing air; 2, that in the case of circumscribed empyema on the anterior surface of the thoracic cavity the heart is almost always dislocated toward the left, and the dulness of the two is continuous.

SURGERY.

UNDER THE CHARGE OF

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SURGICAL TUBERCULOSIS TREATED BY KOCH'S METHOD.

The statement has been frequently made that, in spite of the fact that cases have been treated by Koch's method for many weeks, there are as yet no instances of complete cure. BAUM (*Deut. med. Zeit.*, No. 103, 1890) records two cases which he considers to have been definitely and permanently cured by injection. The first, aged twenty-two years, suffered eighteen years from lupus of the right hand and of the fingers. The disease was extensive and accompanied by much scarring. On the 25th of November 0.008 grm. was injected. The general reaction was very slight. There was, however, marked local reaction. Four days later 0.01 grm. of the remedy was given; this was followed by the characteristic reaction. On the 5th of December, 0.015 grm. was injected. On the 13th of December the whole ulcerating area was entirely healed.

The second patient suffered five years, before treatment, from abscesses caused by caries of the femur. Under surgical treatment these entirely healed. At the time of the Koch treatment there was a large ulcerating area involving the left cheek and the lower eyelid. Two injections were administered, the first containing 0.005 grm. of the remedy; the second, seven days later, 0.008 grm. Local and general reaction were marked. Eight days after the last injection complete healing had taken place.

RYDYGIER, for the purpose of proving the diagnostic value of the Koch material, used it upon a case of rhinoscleroma without exciting any reaction, although the dose was pushed to 0.14 grm.

In another patient who suffered for seven years from epithelioma of the point of the nose there was a superficial ulceration of the right breast of about six weeks standing. This presented the characteristics of lupus. After the first injection of 0.01 grm. there was not the slightest reaction about the nose, but the lupus-patch was decidedly affected.

In nearly all cases of tuberculosis the spleen was markedly enlarged during the reaction period, and in many instances traces of albumin were observed in the urine.

In one case of lupus, although the lungs were perfectly sound, after the first injection of 0.01 grm. the temperature rose to 105° F., but without other symptoms which could give rise to anxiety. Eight days later the second injection of the same strength was given. Collapse lasting for several hours followed, which yielded slowly to repeated doses of cognac, wine, strong coffee, and hypodermic injections of camphor oil. This case is in striking contrast to the majority treated, since the reaction, after the second dose of the same strength as the first, was far more violent than after the first administration of the remedy.

In one case, aged eight years, with sound lungs, but exhibiting scars and ulcers on the left forearm, together with fistulæ extending to the metacarpal bones, 0.006 grm. of the remedy was followed by violent local reaction and collapse which yielded only to most careful treatment, the pulse beating at the rate of 200 per minute. In both these cases it was observed that during collapse there was marked cyanosis of the lips, nose, and fingers.

Rydygier treated many cases of lupus and of bone and joint tuberculosis, two cases of lymphangitis, and several medical cases, by Koch's injection. A child, suffering from caries of the tarsal bones, was operated upon for removal of the diseased tissues. The three cuneiform bones were excised, and the sharp spoon was used many times. In spite of this, and although treatment by means of iodoform and glycerin and Peru balsam had been carefully employed, a fistula persisted. After the first injection of 0.003 grm. of the Koch remedy the fistula closed. Three more injections were given, the strongest containing 0.007 grm. At the time of the report there was free motion in the foot, no pain on pressure, and the patient seemed entirely cured.

In three lupus-cases, and one case of tuberculous ulcer of the skin, the crusts deposited upon the ulcerating area after injection were carefully examined. In only one instance were many tubercle bacilli found.

ANGIER (*Mün. med. Woch.*, No. 49, 1890) treated a girl, aged fourteen years, who had been suffering over four months from an ulcer of the nose involving

the septum; the latter was almost completely destroyed. Since the injection of 0.005 grm. produced no reaction whatever, it was decided that this lesion was syphilitic. The diagnosis was abundantly confirmed by the use of mercury inunctions.

Another case, which had been operated on two years before for the cure of white swelling of the knee, returned to the clinic. Four injections were not followed by local reaction, from which the reporter concludes that the tuberculous areas were either entirely removed, or, if present, existed in a latent form.

Angier states that the fever lasted longer after the first injection than after those which followed. In one case this fever lasted forty-two hours with three exacerbations. When this patient was injected for the second time the fever lasted twenty hours.

Another instance in which the reaction was more violent after the second injection than after the first, was afforded in the person of a girl aged fourteen years, suffering from lupus of the nose and face. The first injection (0.004 c. c.) was given on October 21st. This was followed by local and general reaction of moderate intensity, with marked swelling of the cervical lymphatic glands. This injection was twice repeated in the same dose without exciting alarming symptoms. On the third repetition (December 1st) the general reaction was intense. The face and hands became cyanotic, and the patient suffered from dyspnœa. Shortly afterward there was a violent chill, the temperature ran up to 105.6° F., and the spleen became much enlarged; somnolence alternating with delirium followed. The local reaction was very slight. The general symptoms did not subside till the third day, when the patient again felt quite well, and the lupus-area and swollen glands were found to have undergone favorable changes.

LANNELONGUE (*Bulletin Méd.; Deut. med. Zeit.*, No. 104, Dec. 17, 1890) reports a case of lupus involving the nose, face, and left hand. The patient was eight years old, and suffered from no other tubercular lesions. Three injections were given, when, on the eighth day of treatment, the patient complained of pain in the knees. On examination there was found distinct diminution in the power to rotate the head, very great swelling of both elbows and both shoulders, especially the left; pain in the left thumbs; pain and tenderness in the head of the femur; limited motion in the ankle-joints, and an abundant effusion into both knee-joints.

This, according to Lannelongue, would point rather to diffusion of tubercular infection than to development of latent tuberculosis, since the symptoms described did not appear for eight days after the first injection.

BULIKOWSKI (*Przeglad lekars.*, 50, 1890; *Deut. med. Zeit.*) after observing the effect of the Koch injection, as practised in Kaposi's clinic, comes to the following conclusions:

1. The injection of Koch's material excites in lupus-areas an inflammation accompanied by the well-known general symptoms of reaction.

2. Reaction follows not only in pure tuberculous diseases, but also in others, as, for instance, lepra arabum, lupus erythematosus, and sarcoma.

3. It cannot yet be positively asserted that the injection of Koch's material is always followed by reaction, even though the disease is strictly tuberculous in nature.

EBSTEIN (*Deutsch. med. Woch.; Deutsch. med. Zeit.*, No. 1, 1891) states that the Koch injections are contra-indicated by the presence of tubercular ulcerations of the bowel, especially where there have been recent hæmorrhages, by the existence of constant pain and localized abdominal tenderness pointing to the presence of circumscribed peritonitis secondary to bowel ulceration, by colliquative diarrhœa especially when associated with hectic; and by the existence of tubercular peritonitis accompanied by fluid exudate. Ebstein reports an exceedingly interesting case of tuberculosis in the urethra. The patient was suffering from involvement of the apices of both lungs and from laryngitis of moderate severity. When examined, on his entrance into the hospital, a tight phimosis was found. After operation upon this there was discovered an induration beginning behind the glans penis and involving the corpus cavernosum. This indurated area was about two inches in length and almost an inch in breadth. The borders were irregular, but sharply circumscribed; there was no tenderness on handling, but behind this indurated area pressure gave pain. The urine contained albumin, red blood-corpuscles, and tubercle bacilli. By pressing upon the urethra behind the infiltration, pus containing tubercle bacilli was forced from the meatus. The inguinal glands were slightly enlarged. There was some tenderness on pressure in the region of the left kidney, The patient did not react till the fifth injection, when the dose of 0.01 c. c. was reached. No local reaction was observed, nor was there detected any distinct amelioration in the local lesion.

In a case of brain tumor, Ebstein practised an injection of 0.001 c. c. to determine whether or not this lesion was tubercular in nature. The patient experienced a decided rise in temperature, and had nine convulsions during the night following the treatment; these were apparently due to the action of the remedy upon the intracranial lesion.

In a patient, aged forty years, suffering from what was apparently syphilitic involvement of the sternum and left knee, injections of two, four, and six milligrammes, respectively, excited no fever, but decidedly increased the local pain. After subsidence of the latter there was a marked improvement in the mobility of the knee-joint. A chronic eczema of the leg became red and inflamed.

CZERNY (*Deutsch. med. Woch.*, 51, 1890) practised a hundred and forty-eight injections upon fifty-five patients in two weeks. There were twenty-two cases of joint disease, ten of whom had previously been operated upon. Glandular enlargements, periarticular fistulæ, peritonitis, lupus, periurethritis, and other forms of surgical tuberculosis were treated.

Czerny grants that the Koch material exerts a specific action upon tuberculous processes. There are however, non-tubercular individuals who react to 0.01 c. c. of the material, and again, certain tuberculous patients do not react. While it is true that, as a general rule, the reaction becomes less violent when the injections are repeated, there are exceptions to this. There may be a violent reaction without fever, or the general reaction may be exceedingly well marked, while the local reaction is wanting. Violent general and local reaction in cases which bacteriological and physical examination has shown are apparently sound, would suggest the possibility of a dissemination of the tubercle bacilli. In the initial forms of tuberculosis, and in lupus, the

Koch material is so satisfactory in its results that it may fairly be considered the most brilliant discovery of therapeutics.

Tuberculosis and Pseudo-tuberculosis.

Roger (*Gazette Hebd. de Mêd. et de Chirur.*, 37 An., No. 45) shows that in tuberculosis there is absolutely nothing which may be considered characteristic in the anatomical elements of the lesion, or in the arrangement of these elements. Animal parasites, inert foreign bodies, or the syphilitic lesion, may all be characterized by the central giant-cell with its surrounding zones. The pseudo-tuberculosis from foreign bodies, and that dependent upon verminous parasites, are readily distinguished by the absence of infectious properties. The pseudo-tubercular affections are practically not found in man; in the lower animals, in addition to the causes just named, may be mentioned non-bacterial mycoses (aspergillus), and bacterial zoöglœa and bacilli.

Roger, on the basis of a comparative study, doubts whether the appearance and staining reaction of the tubercle bacillus are sufficiently characteristic to separate it from all other bacteria. The bacillus of fowl-tuberculosis is, on accurate study, found to differ from the human bacillus in regard to its growth on culture media and its virulence when injected into various animals; yet the staining reactions are the same, and the general appearance is almost identical.

In view of the varying progress of tubercular disease in the human being, the rapid course and wide extension in some cases, the long-continued localization and ultimate cure in others, it seems probable that there may be in man several varieties of bacillus reacting in the same way to stains, but possessed of different pathogenic properties.

Microörganisms of Suppuration as Accessories to the Tubercle Bacillus in Lupus.

After careful bacteriological and clinical study, Leloir (*Le Mêdecine Moderne*, 1re An., No. 49) finds that in many cases the ulcerations and nodosities characterizing a lupus-area and its environment are immediately excited, not by the tubercle bacilli, but by the microörganisms of suppuration. The lupus-lesion is essentially a dry tubercle. Ulceration does not usually occur except as the result of the action of suppuration microbes.

When the Koch bacilli and pyogenic microörganisms combine their action the elementary lupus-lesions become softened and exhibit a tendency to suppuration and ulceration. This fact is of major importance from a therapeutical standpoint, since anti-tubercular treatment will often aggravate symptoms which will promptly yield to anti-suppurative applications.

Hernia through the Foramen of Winslow.

Michel Gangolphe (*Lyon Mêdicale*, t. lxiv. p. 607, 1890) reports a case of this rare condition. The patient, a man aged fifty-seven years, was seized, twenty-four hours before admission to the hospital, without any appreciable cause, with violent intestinal colic, vomiting, and inability to pass gas or fæces. Four years before this he had had an exactly similar attack, which

had easily been relieved by the use of enemata. The obstruction and vomiting continued. There was almost no abdominal distention. The pulse and general condition were good.

Laparotomy was performed four days after the beginning of the attack. The small intestine was explored, and, with gentle traction, there was brought to view a portion which had been subjected to a circular constriction, as shown by the white ring around the bowel and the collapsed portion of the gut beyond. It was supposed that the obstruction had been relieved, and the abdomen was closed. The symptoms continued as before operation, and the patient died three days later. The autopsy showed that almost five feet of the small intestine were contained in the lesser cavity of the peritoneum, having entered through the foramen of Winslow. At the first operation only a portion of the gut had been withdrawn, and the obstruction consequently continued.

The Surgical Treatment of Perityphlitis.

Taffier and Hallim (*Archiv. Gén. de Méd.*, September, 1890, p. 257) present a paper upon this subject. They call attention to the fact that operation for perityphlitis is practised less in France than in other countries. As is the custom here, they apply the term perityphlitis to any inflammation in the neighborhood of the vermiform appendix or the cæcum, regardless of the primary cause of the inflammation. They consider disease of the vermiform appendix the cause of the great majority of inflammations in this region; perforation of the appendix is produced in most cases by a fæcal concretion. They advise operation as soon as the formation of pus is suspected. They call attention to the fact that haste in operating is much less dangerous to the patient than delay. The incision for ligature of the internal iliac artery is the best. The vermiform appendix should always be excised if possible; the abscess cavity well drained and washed out. They mention a case in which the opening in the vermiform appendix—through which a concretion had escaped—was closed with Lembert sutures, and yet three months after the operation the wound reopened and a quantity of mucus was discharged.

The paper is concluded with a long list of cases—by various operators—in which operation had been performed for perityphlitis.

Laparotomy for Gunshot Wound.

Dr. W. T. Scott (*Medical Record*, vol. xxxviii., No. 19, p. 516) reports a successful case of laparotomy for gunshot wound of the abdomen. The bullet was a 0.38 calibre conoidal ball. It entered the abdomen one and three-quarters inches above and to the right of the left anterior superior spinous process of the ilium.

Laparotomy was performed four hours after the receipt of the injury. A small quantity of the intestinal contents was found in the peritoneum. Four perforations of the ileum were discovered within a distance of four inches The ball was not found, and no further injury was detected.

The intestinal wounds were closed with the Czerny-Lembert suture; the peritoneum was freely irrigated and drained with a glass tube. The patient

made a good recovery. The author states that the intestines were comparatively empty at the time of operation.

Renal Disease following Gonorrhœa.

Dr. J. Kennedy (*New York Medical Journal*, vol. lii., No. 16, p. 483, 1890) reports a case of external urethrotomy for stricture of the urethra and chronic cystitis. The patient died a few hours after operation with absolute suppression of urine. The post-mortem showed suppurating kidneys three times the normal size.

The author considers that gonorrhœa may induce disease of the kidneys in the following ways: By direct extension of the inflammatory process; by interference with escape of urine, as in stricture; by reflex irritation; by the excessive and injudicious administration of diuretics.

A New Plate for Intestinal Anastomosis.

Dr. T. B. Robinson (*New York Medical Journal*, vol. lii., No. 16, p. 429, 1890) offers a new plate for intestinal anastomosis. The plate is made of raw hide, prepared by shaving the hair from the green hide of an ox. The hide is then cut into strips one inch wide by two and a half inches long, and perforated by a diamond-shaped aperture. The plates are armed with four or six sutures and needles. He claims that these plates are eminently suitable for the operation of intestinal anastomosis. They are accessible and easily prepared. They are absorbable, and can be well adapted to the character of the intestinal tract.

The author advises the use of omental grafts in most operations upon the intestines. He has used this method of anastomosis satisfactorily in over one hundred and sixty experiments upon the lower animals.

The Management of Damaged Bowel in Strangulated Hernia.

Bennett (*The Lancet*, No. 16, vol. ii., 1890, p. 805) reports three cases of strangulated hernia, in which there was present damaged bowel. In the first case there was a lacerated opening into the intestine, through which fæces had escaped into the hernial sac. The opening was closed by buried sutures in the mucous membranes, and by Lembert sutures; the bowel was returned, and the abdomen closed without drainage. The patient recovered easily.

In the second case there was degeneration of the bowel, and a breach of surface involving the peritoneal and muscular coats. The tissues were so softened that suturing was impossible. The bowel was washed and returned just inside the ring, and a large drainage-tube placed in contact with it. Ten days after the operation fæces escaped through the tube. Four weeks after the operation the fæcal fistula had completely closed.

In the third case the sac was stinking and gangrenous, the contained gut piebald in aspect, lustreless, and, so far as could be judged, obviously gangrenous. The gut was returned just inside the ring, and a large drainage-tube was introduced as near the diseased bowel as possible. Recovery took place without the formation of a fæcal fistula.

The author explains the recovery in the last case in this way: By reason

of the thorough antiseptic cleansing of the affected bowel the gangrenous portion was enabled gradually to disintegrate and come away through the large tube without the formation of any gross interruption of continuity in the intestinal wall.

The author advises in the treatment of damaged bowel in strangulated hernia: Free division of the stricture; the return of the intestine just inside the abdomen with as little pressure as possible, after thorough antiseptic cleansing; the careful adjustment of a drainage-tube, having a diameter of not less than half an inch, in such a way that its inner extremity may lie almost in contact with the reduced bowel. He considers resection very rarely necessary; and the formation of a fæcal fistula, as in the second case, very much to be preferred to the formation of an artificial anus at the time of operation.

OTOLOGY.

UNDER THE CHARGE OF

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Post-mortem Examination of the Ear in a Case of Acquired Deaf-dumbness.

Drs. P. C. Larsen and Holger Mygind, of Copenhagen, have given an account of this very interesting case in a recent number of the *Archiv für Ohrenheilkunde* (vol. xxx., September, 1890). The patient, when two and a half years old, was attacked with some form of cerebral disease, for which no physician was called. In the course of eight weeks after recovery it was discovered by his family that he was deaf. Before the attack he undoubtedly heard well. From the notes given it would appear that the child had suffered from cerebro-spinal meningitis. When about twenty-one years old this young man died of phthisis, in the Royal Institution for the Deaf and Dumb, Copenhagen.

Both temporal bones were examined within two hours after death by the above-named observers. The right temporal bone was normal in shape and size. The aqueducts of the vestibule and cochlea were impervious a few millimetres from their external openings. The external auditory canal was normal, and closed at its inner end by a normal membrana tympani. The malleus was slightly retracted and not very movable from without. The tympanic cavity was normal in shape and size. The mucous lining was thin and pale, and not thrown into folds; nor were there any adhesions. The entrance to the mastoid antrum and Eustachian tube was of normal appearance. The mastoid cells were normal. The Eustachian tube was not narrowed. Hammer and anvil were of natural form and size, with freely movable joint between them. There was also free motion in the anvil-stapes joint. The

stapes looked normal, excepting an unusual divergence between the crura. Closer examination of the joint between the stapes and the oval window revealed that the base of the stapes was absent and the crura ended free. The oval window was somewhat contracted so as to appear like a slit 2½ mm. long, wider at the anterior end. At this anterior part of the window the free anterior crus of the stapes was fastened. The posterior crus of the stapes rested in the oval pelvis about ½ mm. behind the posterior edge of the oval window, and was bound fast at this point by fibrous adhesion. The fossula of the round window was present, but entirely filled with an osseous mass. The tensor tympani and stapedius muscles were present, apparently normal.

In the *labyrinth* there was no trace of semicircular canals, because that part of the petrous bone which corresponds to their seat was changed into a compact bony mass. The cavity of the vestibule was considerably narrowed in extent and form, and was without a trace of normal membranous contents.

Of the *cochlea*, only the first whorl was discernible, yet this was filled with a sclerotic bony mass.

The internal auditory canal was of normal appearance and width. However, there were no traces of maculæ cribrosæ superiores, mediæ, nor inferiores.

The left temporal bone showed the same changes as the right.

The *auditory nerve* on both sides was present, but considerably thinned.

The *brain* was normal excepting that the lowest frontal convolution on the left side, as also the neighboring convolutions of the island of Reil, was markedly lower and narrower than those on the right side. The furrows between them were wider. The striæ acusticæ were plainly discernible, and the origin of the acoustic nerves was normal.

Two Cases of Necrosis of the Cochlea.

Dr. Thies, assistant in the aural clinic of Dr. Trautmann, of Berlin, narrates two cases of the above-named disease (*Archiv f. Ohrenheilkunde*, Bd. xxx., September, 1890). Both of these cases furnish the following corroborations of the observations of others in similar occurrences:

1. The total facial paralysis in such cases may disappear after the cochlea is thrown off as a sequestrum, as in one of the cases.
2. The facial paralysis may continue after the elimination of the cochlea. The latter result is the most common.
3. Absolute deafness is the result in the affected ear.
4. Vertigo and subjective noises may continue, even if only slightly.

Ossification of the Membrana Tympani.

An account of this rare occurrence is given by Dr. Habermann, of Prague, having been observed by him in Kohler's clinic (*Prager med. Wochenschrift*, Sept. 24, 1890). A woman, thirty years old, presented symptoms of profound anæmia, cirrhosis of the liver, and pneumonia of the left lower lobe. Post-mortem examination revealed chronic tuberculosis of the apices and of the peribronchial glands, with other grave lesions of the viscera.

The left organ of hearing was examined by Habermann. Nothing abnor-

mal was found in the external auditory canal. The dura mater over the temporal bone was very pale, the tegmen tympani thin, and over the antrum transparent. The membrana tympani had in it a heart-shaped perforation, and was greatly thickened and of a grayish color. Microscopic examination of sections of the drum-membrane revealed numerous bone-cells at a point corresponding to the lower edge of a calcareous spot.

Chronic Circumscribed Inflammation, with a Polyp in the External Auditory Canal, the Result of Pressure from a Wax-plug.

Dr. A. Eitelberg, of Vienna, relates a case of the above-named nature (*Wiener med. Presse*, No. 39, September 28, 1890). The history of the case shows that a chambermaid, twenty-two years old, had suffered for two months with a slight, continuous pain in her right ear. There was no tinnitus nor dulness of hearing. The ear had never been previously affected. Examination of the ear revealed on the anterior, lower wall of the auditory meatus at its outer edge a tumor the size of a pea, which proved sensitive and fluctuating when touched with a probe. The skin covering it was neither red nor swollen; the rest of the skin of the canal also appeared normal in this respect. There was a wax-plug in the fundus of the canal, and after the removal of the latter by syringing the membrana tympani appeared macerated, and a polyp was revealed situated at the inner third of the hinder and lower canal-wall. This growth was about five millimetres long and three millimetres wide, flattened, very red, and looked very much like a pointed condyloma. The ear was then stopped with cotton, and the patient seen in two days, when it was found that the tumefaction at the meatus had disappeared, and all pain in the ear had ceased. The polypoid growth, however, was unchanged and bled upon a slight touch with the probe. This growth was then watched for two weeks, but no treatment was applied to it. As it did not change in any way in this time its pointed extremity was touched with a little chromic acid, which was repeated once five days later. After three weeks absence the patient was again examined, when it was found that the polypoid growth had disappeared.

The writer observes that often such polypoid growths undergo spontaneous involution upon the removal of the irritant from the external ear. Even in this case, Eitelberg does not think the two applications of chromic acid destroyed the polypus, but that it really underwent spontaneous metamorphosis. The chief prompting to the publication of this case was the peculiar causation of the polyp, viz., a chronic circumscribed inflammation in the external auditory canal.

Influenza–otitis.

Ludewig, of Halle, maintains that bacteriological study has not yet settled the identity of grippe (*Archiv f. Ohrenh.*, vol. xxx., September, 1890). The pandemic induced a large number of cases of acute otitis media. In December and January of 1888 and 1889 the number of acute ear cases in the Halle clinic was 39; in the corresponding period of 1889 and 1890 they amounted to 129. There were no pathognomonic characteristics in these cases; hence there was no special form of treatment. "Frequently the inflammation (in

the middle ear) attacked the bone, and not infrequently we observed acute caries." One fatal case of consequent pyæmia was observed.

According to the experience in the clinic at Halle, influenza-otitis is sometimes a malignant and life-threatening disease, which, in conjunction with pyæmia and meningitis from empyema of the frontal sinuses, presents the most frequent cause of death, after pneumonia.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

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Treatment of the Larynx in Tuberculosis.

In a discussion on the treatment of laryngeal disease in tuberculosis held at the late meeting of the British Medical Association (*Brit. Med. Journ.*, Sept. 13, 1890), Mr. Charters J. Symonds, while approaching the subject from a surgical point of view, which endorsed proper efforts to rid the larynx of local diseases by surgical procedures, called attention to the fact that cicatrization of tuberculous ulceration of the larynx sometimes occurred spontaneously; and he intimated the possibility of such a process having taken place in some of the cases treated by curetting, and frictions with lactic acid. We should feel, however, that a cicatrization in immediate sequence to the procedures mentioned should be undoubtedly attributed to the beneficent influence of the procedure; spontaneous elimination of tubercle and cicatrizations of losses of substance progressing far more slowly.

Mr. Symonds narrated two cases illustrative of spontaneous cicatrization. One occurred under six months' good diet and attractive outdoor exercise and recreation in the country, with recurrence on return to town and a fatal termination. The other cicatrization took place under sedative treatment and the administration of mercury, and remained undisturbed until the patient's death from the constitutional disease; the laryngeal disease having been under observation for two years and three months, its symptoms having existed for more than three years. He referred to a few interesting personal observations of nodular infiltrations, which were partly removed in masses with gouge cutting-forceps, the double curette of Krause, and the remainder submitted to frictions with lactic acid with great benefit. The indications for topical or surgical treatment of laryngeal tubercle are very properly based by Mr. Symonds on the lines followed in the treatment of tubercle in other accessible portions of the body, or, as we should put it, on the general principles of good surgery. One of his conclusions, that endo-laryngeal methods are sufficient to remove and treat the disease in the majority of cases, we cannot endorse. They can be treated, yes; but as to the removal of the

disease, as least as it occurs in the United States, that result is limited to a great minority of cases in which the disease is quite favorably located for endo-laryngeal access and rather circumscribed in its extent.

Dr. G. Hunter Mackenzie, of Edinburgh, in continuing the discussion, expressed his approval of the title of the subject under discussion, which included all laryngeal complications in tuberculosis, whether tuberculous, non-tuberculous, or mixed. In considering the possibility of influencing the organism on which the disease depends, Mackenzie has been struck with the enormous numbers and large size of the bacilli in the expectoration from laryngeal tuberculosis as compared with that from purely pulmonary tuberculosis; indicating to him that laryngeal tuberculosis presents an intense—probably the most intense—form of the disease, entirely apart from complications attendant upon its location. He believes that in the presence of extensive pulmonary disease laryngeal tuberculosis should not be subjected to violent or heroic treatment; a belief, we fancy, that is very generally entertained. Sedative topical treatment, symptomatic in its selection, is the only topical treatment for which Mackenzie sees any justification.

The simple laryngeal catarrh of pulmonary tuberculosis is regarded as a contra-indication to sojourn in high latitudes, which tends to its aggravation.

Tuberculosis in coexistence with syphilis is believed to occur more frequently than is generally supposed. It would be diagnosed by occurrence of tuberculous bacillary sputum in the presence of evidences of syphilis of the larynx, the mouth, and the parts adjoining.

Mr. Henry T. Butlin had found his best results in frequent insufflations of iodoform, combined with general remedies. Under this treatment he had known what appeared to be complete recovery in a severe case of pharyngeal and laryngeal tubercle. He had no experience with electrolysis or with curetting.

Mr. E. Clifford Beale had frequently noted adherence for weeks of small masses of inspissated mucus associated with catarrhal lesions of ordinary phthisis. He suggested that these localized lesions are liable to become the seats of tuberculous infiltration if neglected or allowed to pass undiagnosed. In most cases perfect cure could be effected by simple cleansing.

Dr. Greville Macdonald doubted whether all superficial excoriations of the larynx were necessarily tuberculous in tuberculous subjects. He had often observed their spontaneous cicatrization.

The views of other participants in the discussion were mainly in accord with the views of those who opened it. There was a general concurrence as to the impropriety of tracheotomy except when indicated for the immediate or immediately proximate preservation of life in cases with pronounced pulmonary lesion, its performance as a therapeutic measure being generally condemned.

Spontaneous Recession of a Laryngeal Papilloma after Tracheotomy.

Dr. W. M. Cowgill, of Paducah, Ky., reports (*Medical News*, October 4, 1890) an instance of an extensive papilloma in the larynx of a girl six years of age, whose difficulty in breathing had existed for four years. The intense

dyspnœa required relief, so laryngo-tracheotomy was performed and a canula was inserted. It was subsequently found impossible to remove the growths through the natural passages, and thyrotomy was proposed for gaining access to them, but was objected to by the parents. Little, if any, change ensued for two years. Then evident recession had begun; and in three years and eight months after the tracheotomy it had progressed to such a degree as to leave but a small papilla about one line in length projecting from the posterior wall of the larynx.

Carcinoma of the Larynx.

At the late International Medical Congress Mr. Henry T. Butlin, of London, read a paper "On Radical Operations for the Cure of Intrinsic Carcinoma of the Larynx" (*Brit. Med. Journ.*, August 23, 1890), in which, after reviewing the results in a statistical compilation of 102 operations for intrinsic carcinoma on 95 patients, including 23 thyrotomies, 23 partial excisions, and 51 complete laryngectomies, he concludes that the only hope of success in laryngectomy lies in the first operation, and if this fails there will be little prospect of relief from surgical interference.

He would urge the smallest operation consistent with the widest excision of the disease and the removal of wide area of surrounding tissue, without reference to the removal of one-half of the larynx or the whole organ. He deems it essential to this end that the larynx should be widely opened and examined; for the disease almost invariably occupies a wider area than is disclosed under laryngoscopic inspection.

Rhino-pharyngeal Myxoma at Six Years of Age.

Dr. Alexander MacCoy, of Philadelphia, has reported (*N. Y. Med. Journ.*, Sept. 27, 1890) an instance of myxoma weighing six drachms, which he removed with the electro-cautery snare from the free surface of the vomer of a female child six years of age.

[Myxomas at this early age are very rare. A few weeks ago a rhino-pharyngeal myxoma with multiple attachments, in a boy five years of age, was exhibited and operated upon with forceps at the compiler's clinic in Jefferson Medical College.—Ed.]

Stenosis of the Larynx from Foreign Body without Characteristic Symptoms.

Dr. E. Kossow-Gerronay reports (*Wien. med. Woch.*, No. 35, 1890) a case of sudden asphyxia in a patient who had suffered for four weeks with laryngeal pain, hoarseness, and cough, and who had expectorated shreds of membrane. Immediate tracheotomy, artificial respiration, and injections of ether restored the patient. Laryngoscopic examination then disclosed a foreign body beneath the left vocal band, projecting across one-half of the diameter of the trachea. It was subsequently removed by Dr. Schopf after splitting the larynx, and it turned out to be an embedded fragment of bone surrounded and partially overgrown with granulations. There was no clinical history whatever of the aspiration of the foreign body.

A Cured Case of Primary Tuberculosis of the Pharynx.

Dr. J. W. Gleitsmann, of New York, reported (*N. Y. Med. Journ.*, Oct. 11, 1890) to the International Medical Congress at Berlin a case of primary tuberculosis in a female patient thirty-eight years of age, cured by scraping the ulcerating tissues, and energetic frictions with lactic acid, with occasional resort to the electric cautery. Cases of this kind are very rare.

[A cured case of tuberculosis of the pharynx in the compiler's consultation practice was referred to in these columns a few years ago in connection with some pertinent abstracts, but that case did not reach anything like the ravages described in the present instance.]

Withdrawal of a Needle from the Trachea through the Natural Passage.

An interesting case, very ingeniously handled, has been reported by Dr. Franz Hinrichs, of Berlin (*Deut. med. Woch.*, Sept. 11, 1890).

A tailor drew a threaded needle into his trachea by aspiration. Laryngoscopically the string projecting from the mouth was seen to extend down the left side of the trachea. The needle lay across the middle of the orifice of the left primitive bronchus, one extremity imbedded in the left wall of the trachea, and the other a little more deeply in the spur of the bifurcation, but it was impossible to distinguish which end was the point and which was the eye of the needle. After failure with a variety of devices at extraction mentioned in detail, withdrawal was accomplished by the following procedure. The point of a long probe was bent into a rectangular hook about half a centimetre in length, and while Dr. Hinrichs held the thread taut, the consultant, Dr. Schirler, succeeded under laryngoscopic inspection in passing the hook under the upper end of the needle and in detaching it from the tracheal wall, the point remaining imbedded in the spur of the bifurcation. By means of the sound he was enabled to keep the needle in a proximatively vertical position during its dislodgement by traction upon the thread. During its slow withdrawal it was caught several times under the projections of the rings of the trachea, whence it was as often dislodged with the sound. The last obstacle thus surmounted was the right vocal band. The needle was 3.5 centimetres long, and was rusted to within 1.1 centimetres of the point, and 0.2 centimetre of the eye, the parts imbedded in the tissues having retained their lustre. The operators are to be congratulated on their pluck, skill, and pertinacity, through which they spared their patient the necessity of submission to tracheotomy.

Intubation in Syphilitic Stenosis of the Larynx.

At the late International Medical Congress a paper on Intubation of the Larynx in Acute and Chronic Syphilitic Stenosis (*Med. Record*, Oct. 4, 1890) was read by Dr. George M. Lefferts, of New York, strongly advocating the procedure in preference to all others. His personal experience in ten cases is recorded in exemplification of the views maintained in his argument.

Paralyses of the Larynx.

Two cases of unilateral paralysis of one crico-arytenoid muscle, both in females, cured mainly by progressively increasing doses of strychnine sulphate, are reported by Dr. Fletcher Ingals, of Chicago.—*N. Y. Med. Journal*, Sept. 27, 1890.

Unilateral Paralysis of the Abductors of the Larynx.

Dr. Bosworth, of New York, has reported to the American Laryngological Association (*N. Y. Med. Journ.*, Oct. 11, 1890) a case of unilateral paralysis of the abductors of the larynx, the result of an attack of bulbar disease with unusual symptoms, and which was apparently caused by suppurative disease of the antrum. After the establishment of the disease of the antrum there was a history of partial motor paralysis of the entire right side of the body from crown of head to sole of foot, associated with absolute loss of the sense of temperature on the left side, but not of the tactile sense. When Bosworth was consulted for the antrum disease, several months after the onset of the paralysis, from which the patient believed himself to have become thoroughly recovered, he noted some failure to appreciate sensations of heat and cold on the left side of the body. Laryngoscopy revealed the right vocal cord lying motionless in the middle line, in a condition of complete paralysis of its abduction. Otherwise the patient was in perfect health, and gave no evidence of any impairments or the ordinary muscular tests of spinal and bulbar disease. Bosworth believes that there had been a thrombosis of one of the small arteries of the medulla in consequence of suppurative disease of the maxillary sinus; and that early reëstablishment of the circulation relieved all the paralytic effects save that of abduction of the right vocal cord; the diseased process seeming to have isolated the ganglion which presides over the respiratory function of one side of the larynx.

Laryngectomy.

At a recent meeting of the *Berliner medicinische Gesellschaft*, Dr. Eugene Hahn exhibited a specimen from a patient upon whom he had performed a very extensive operation in 1880. Regional recurrence took place nine years later, and the patient died in 1889 at the age of seventy-eight years. A portion of the hyoid bone, one-half of the larynx, and one-half of the epiglottis had been removed. He also mentioned a case in which he had been compelled to excise a portion of the carotid artery and a portion of the internal jugular vein in order to remove the entire disease. Recurrence ensued, and the patient perished by purulent bronchitis and pneumonia some ten weeks after the operation. This was the only case lost of six laryngectomies Hahn had performed since 1888.

In conclusion, Hahn expressed the opinion that when carcinoma has become so extended as to require extirpation of the entire larynx, it is better, in most instances, to avoid the operation. Favorable results ensue only in those cases in which it is practicable to perform an operation early in the disease.

DERMATOLOGY.

UNDER THE CHARGE OF

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Histology of Tuberculous Skin after Injection with Koch's Fluid.

Gustav Riehl, of Vienna (*Wiener klinische Wochenschrift*, No. 51, 1890), describes the histological changes in a patch of tuberculous skin after the injection of Koch's fluid. Briefly, the changes consist in an acute exudative inflammation with fibrinous and cellular exudation in the immediate neighborhood of the tuberculous infiltration. The changes in the bloodvessels, the formation of vesicles, the abundant presence of leucocytes in the tissues, the deposit of fibrin about the tubercle, in the papillæ, and even into the epidermis, are all signs of inflammation with abundant exudation.

Observations on Koch's Fluid in Dermatology.

Prof. Pick, of Prague (*Prager med. Wochenschr.*, No. 52, 1890), experimented with injections of Koch's fluid in 7 cases of syphilis; 3 of rhinoscleroma; 1 of lupus erythematosus; 1 of Addison's disease. In none of the syphilitic cases was there any reaction upon the neoplasmata, though there occurred general disturbance in several cases. In one case of syphilitic condylomata in association with tuberculosis cutis verrucosa, there took place a strong general reaction, and also an intense local action on both tuberculous deposits, corroborating Koch's assertion of the elective affinity of the virus, and of this point being of diagnostic value. In one case of pure rhinoscleroma there was no reaction, but in two other cases of the same disease with tuberculosis of the lungs there occurred general reaction, but without a sign of local action on the rhinoscleroma. Lupus erythematosus showed no irritation. Because of general reaction in the case of Addison's disease, the idea of tuberculosis of the supra-renal capsule suggested itself.

In a second series of experiments, there were thirteen cases of lupus, of whom the majority showed other internal or external signs of tuberculosis. In all cases the typical local and general reaction took place. Of the general symptoms, the frequent occurrence of diverse exanthemata was noted, including urticaria, measly, roseolar, and scarlatinous eruptions. Alarming symptoms occurred in only one case. Pick thinks that the remedy is one of great scientific importance, of priceless value, and a curative agent for tuberculosis.

Relation of Lupus to Tuberculosis.

Jonathan Hutchinson (*Lancet*, January 17, 1891) does not believe that there is a disease which, to the exclusion of all others, deserves the name of lupus. No symptom or set of symptoms will enable anyone to recognize with certainty all cases of lupus, because the diseases which have been classed under it are not clearly specialized. It is often quite impossible to diagnose between scrofulous ulcers and lupus, and between ulcerating chilblains and lupus, to say nothing of the rare forms known as acne-lupus, sebaceous-lupus, and those cases on the borderland of lupus erythematosus and lupus vulgaris. "Whenever a chronic inflammation of the skin or mucous membrane, not due to syphilis, shows a persisting tendency to spread at its edges, to produce satellites near it, and to leave a condition of scar behind it, such a process is one of lupus." Nothing is less common than to see a lupus-patient pass into phthisis. Thus the infective material, whatever it may be, is one which finds a suitable home only in cutaneous or mucous structures; if a bacillus, it is a selective one, and keeps to the tissue in which it had its first development. The most typical forms of common lupus are often coincident with good health on the part of the patient, and the absence of any family history of tendency to tuberculosis. The connection between tubercular affections and lupus is far less close than is generally believed. No observer has succeeded in detecting the bacillus in lupus erythematosus, yet it is far more frequently in close association with tuberculous conditions than is lupus vulgaris.

The diseases of the skin, other than lupus, which are supposed to be in association with scrofula and specific tuberculosis, may be referred to. The typical form of scrofula, in connection with suppurative disease of the lymphatic glands and cellular tissue and skin, does not usually assume the conditions known as lupus, but in most instances they are distinct. If lupus is a tubercular disease—*i. e.*, bacillary in origin—it is certainly extraordinary that in gland struma the skin does not assume a lupus-state, nor conversely, that the glands do not suffer in lupus. True tuberculosis of the skin, distinct from lupus and scrofulous ulceration, as described by French and German writers, seems to be almost unknown in Mr. Hutchinson's vast experience. He alludes to the affection. Lichen scrofulosorum is referred to, and is considered scrofulous in nature and distinct from lupus. Lupus verrucosus, the author states, cannot be distinguished from verruco-necrogenica; the latter occurs in persons not otherwise scrofulous, and does not lead to infective tuberculization in other parts or organs. There is no evidence that lupus ever begins from the implantation of tuberculous matter. Lupus is only exceptionally associated with tubercle in the viscera, and it never causes infective gland disease. Mr. Hutchinson thinks that the evidence is in favor of regarding lupus as a specialized form of chronic inflammation rather than the result of infection.

The Seborrhœic Wart.

Careful study of the seborrhœic wart by S. Pollitzer (*British Journal of Dermatology*, vol. ii. No. 21, 1890) shows the formation to be "characterized

histologically by a slightly-thickened stratum corneum, a considerably hypertrophied Malpighian layer, and in the papillary and subpapillary layer, the occurrence of epithelioid cells, arranged in groups and lines separated by bundles of connective tissue, and terminating abruptly below the horizontal subpapillary plexus of vessels; together with a peculiar infiltration of fat, affecting the coil-gland epithelium, the middle and papillary layers of the cutis, and the epithelium of the rete Malpighii; and perhaps an atrophy of the sebaceous glands and hair-follicles." The presence and peculiar arrangement of the epithelioid cells, the author considers, would indicate that the growth could probably be, with propriety, classed as a lymphangio-fibroma (Recklinghausen).

Some of the Rarer Effects of Pediculi.

Jamieson notes (*British Journal of Dermatology*, vol. i. No. 10) the somewhat rarer effects produced by pediculi under the two headings—Local: 1. Maculæ cæruleæ; 2. Pigmentation. And Reflex: 1. The presence or absence of itching; 2. Pyrexia.

The so-called maculæ cæruleæ, or taches blenatres, are steel-gray, pea-to-finger-nail sized stains occasionally to be seen on the trunk and the inner aspects of the thigh and arm. They were formerly thought to be indicative of fever, but observation and experiments have shown them to be due to pediculi pubis.

The brownish pigmentation is not uncommon, and results from the hyperæmia produced by the continual irritation of the pediculi corporis and the consequent scratching. It is usually brownish, but exceptionally may be almost black.

As to the reflex effect, itching is the rule, but in a few instances it has been entirely wanting; and, according to Jamieson, in those cases which show maculæ cæruleæ. Pyrexia has been noted in rare cases, the temperature reaching several degrees above normal, which has entirely subsided after a bath and change of linen. Two such cases are briefly referred to. The pyrexia, apparently, was due to peripheral irritation; in neither of the cases was there any inflammation of the skin.

OBSTETRICS.

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Cæsarean Section at the Rotunda Hospital, Dublin.

Macan (*Dublin Journal of Medical Science*, p. 361, 1890) reports the first Cæsarean operation at the Rotunda Hospital in one hundred and thirty years. The patient was a primipara, three feet seven and a half inches tall, and with

a considerably contracted pelvis, the true conjugate being two inches. The usual Cæsarean operation was performed, the uterus being closed by silk by the method employed by Fritsch, and an elastic ligature having been used to control hæmorrhage. An uncomplicated recovery followed the operation.

The Cæsarean Operation.

Goullioud (*Archives de Tocologie*, No. 11, 1890) reports a case of Cæsarean section in a woman presenting a contracted pelvis, the true conjugate measuring two and one-third inches, the shoulder presenting, the amniotic liquid having escaped eighteen hours before admission to the hospital, and the child still living. Basiotripsy had been performed a year previous upon the same patient. On examination it was found impossible to make version, and accordingly Cæsarean section was done. The uterus was closed with chromic-acid catgut. The sero-serous suture was carefully made with fine catgut, and the usual antiseptic dressings applied. The patient's temperature and pulse rising after the operation, the lower angle of the wound was opened, and a rubber drainage-tube inserted and antiseptic injections were made. Recovery of mother and child followed.

Meningeal Hæmorrhage in the Newborn.

Richardiere (*La Médecine Moderne*, No. 44, 1890) reaches the following conclusions from a medico-legal study of cases of meningeal hæmorrhage in the newborn: These hæmorrhages are a frequent cause of death, and occur at the moment of birth. They differ from similar hæmorrhages in the adult by the absence of inflammation of the arachnoid and of the dura mater. They are usually accompanied by sub-pleural ecchymoses. Death generally results suddenly. The cause of the hæmorrhages is traumatism occurring during labor, and especially traumatism upon the fœtal head at the moment of its passage through the bony pelvis.

The Treatment of Placenta Prævia.

Hart (*Edinburgh Medical Journal*, p. 416, 1890) defines a normal insertion of the placenta as being above the level of the lower uterine segment. Placenta prævia exists in those cases where part of the placenta dips into the lower uterine segment. He would not call hæmorrhage in such a placenta accidental hemorrhage, but would restrict the term to bleeding caused by separation of the placenta when normally situated. He has found by observation that although the arterial supply of the lower uterine segment is not increased in placenta prævia, the venous circulation is markedly so.

Regarding treatment, it is of cardinal importance to prevent loss of blood. Prolonged interference should be avoided, thorough antisepsis maintained, and the interests of the mother held to be paramount. When definite hæmorrhage has come on, chloroform should be given, the cervix dilated to admit two fingers, bipolar version performed and a foot brought down, and delivery should be allowed to proceed spontaneously. Rupture of the membranes is admissible only in minor cases. Regarding the plan of complete dilatation with Barnes's bags and rapid delivery, Hart believes that it increases the

chances for the child's life at the risk of the mother's. In selecting methods of stimulation, he places first repeated subcutaneous injections of sulphuric ether. The patient should drink hot water in considerable quantities. Fluid enemata may also be given. In severe cases auto-transfusion should be performed by bandaging the legs. The best method of direct transfusion is the injection in the infra-clavicular or inter-scapular regions of six-tenths per cent. salt solution at a temperature of 100° F. A simple funnel with India-rubber tubing and needle are all that are requisite. In post-partum hæmorrhage after placenta prævia the tampon of iodoform gauze will be found of value.

The Intra-uterine Tampon after Placenta Prævia.

Audrey (*Archives de Tocologie*, No. 10, 1890) reports two cases of placenta prævia in which hemorrhage persisted after the delivery of the fœtus, and was checked by the use of a tampon of iodoform gauze after the failure of other methods. The tampons in each instance were allowed to remain undisturbed for twenty-four hours, and in both cases uncomplicated recovery ensued.

Rupture of the Membranes Twenty-five Days before the Birth of a Living Child.

Egan (*Medical Record*, p. 457, 1890) reports the case of a multipara who had had four miscarriages, the causes of which had not been ascertained. When the os was dilated to the size of a dollar, the head presenting, the membranes ruptured. The pains were trivial in character, and the head receded and descended alternately. A hypodermic injection of half a grain of morphine in four doses produced a night's rest. The pains continued ineffective, and the patient resumed her household duties until twenty-five days after the rupture of the membranes, when a living child was expelled. But one opening could be found in the membranes.

Puerperal Endocarditis and its Pulmonary Complications.

Luzet and Ettlinger (*Archives Générales de Médecine*, January, 1891) have found that puerperal endocarditis of septic origin occurs most frequently upon the right side of the heart. The infection spreads thence to the lungs. The course of the disease is prolonged, and its duration several months. Pulmonary complications are the rule. They are caused by multiple septic emboli, whose formation and deposit occur so slowly as frequently to give rise to a diagnosis of tubercular disease. When the infection is mild in character the patient very often survives.

A Second Tubal Gestation Diagnosticated and Removed before Rupture.

Herman (*British Medical Journal*, No. 1552, 1890) reports the case of a multipara from whom he had removed a ruptured tubal pregnancy from the right side. Over three years afterward ectopic pregnancy upon the left side

of the uterus was diagnosticated. Upon laparotomy the pregnancy was found to be tubal and unruptured. The tube was removed, and measured two and a half inches long, and one and a half inches at its widest part. It contained a fœtus one third of an inch long. The wall of the tube was three-eighths of an inch thick, resembling the placenta in ectopic gestation. The case is interesting from the diagnosis made before rupture; the occurrence of ectopic gestation in first one tube and then the other, and the duration of the pregnancy, which was about three months. The embryo had died at the end of the first month, and hæmorrhage had taken place into the chorion.

The Treatment of Syphilis during Pregnancy.

Besnier (*Journal de Médecine*, November, 1890) has obtained good results in the treatment of syphilis, during pregnancy, by the administration of cinchona wine and syrup of the iodide of iron as tonics, together with nourishing food. The patient also took daily a pill containing one-sixth of a grain of bichloride of mercury combined with one-twelfth of a grain of extract of opium and one-twelfth of a grain of extract of gentian, the whole rubbed up with glycerin. Iodide of potassium was also advised in amounts of from seven and a half to fifteen grains daily.

Recent Results from the Study of Labor by Frozen Sections.

Barbour (*British Medical Journal*, No. 1557, 1890) concludes from the study of frozen sections of a patient during labor, that the retraction of the uterus changes remarkably the thickness and consistence of the uterine wall. These walls are always in apposition, except when the placenta and membranes remain in the upper uterine segment. After their removal the uterine walls come into apposition. Regarding the diminution in the size of the oblique diameters at the pelvic brim, he finds that, excluding a loop of intestines, the thickness of the soft parts at both ends of the oblique diameters is in all about seven-eighths of an inch. In estimating, then, the available space in these diameters, we must deduct almost an inch from measurements made upon the bony pelvis. Below the brim the shortening becomes more marked through the *obturator internus* and the cellular tissue of the broad ligament containing venous sinuses. These sinuses are compressed during labor.

Death from Latent Heart Disease.

Bartaux (*Journal des Sages-Femmes*, November 1, 1890) reports the death, three hours after labor, of a well-nourished patient, who had suffered shortly before the end of labor with dyspnœa and failing heart-action, which treatment did not relieve. An old endocarditis was found in the left ventricle and the mitral orifice greatly contracted. Extreme pulmonary congestion with nutmeg-liver and beginning sclerosis of the kidney were present. Thirteen years before her last pregnancy the patient had rheumatism and endocarditis with valvular affection. The amount of hypertrophy was slight; pregnancy had resulted in heart-strain, and variation in blood-pressure caused by labor terminated in the death of the patient.

Ovarian Gestation.

A case of this rare pregnancy is reported by Reeves (*Lancet*, p. 872, 1890). The patient was a multipara, who complained of pain from a pyriform tumor in the centre of the abdomen, which was smooth and tense, and projected anteriorly. This tumor was not connected with the uterus. Her history was that of previous miscarriage with derangement of menstruation, and irregular flow followed. Fœtal movements were felt, and attacks of sudden pain had been experienced. The uterus was enlarged. On laparotomy a cyst was found in the centre of the abdomen which, when punctured, yielded three ounces of thick, yellowish fluid. The sac was then opened, and a dead child and a macerated placenta were delivered. The broad ligament was then tied in a double ligature close to the uterus. No trace of the ovary upon the left side could be found; the right ovary was sclerotic and was left. The pedicle was treated within the abdomen, and a glass drainage-tube was employed. A further examination of the case revealed an ovarian, ruptured pregnancy.

Tubal Pregnancy with Rupture at an Early Stage.

Draper (*Boston Medical and Surgical Journal*, January 8, 1891) reports a case of tubal pregnancy in a young primipara admitted to the hospital in shock from ruptured tubal pregnancy. The case proved rapidly fatal, and upon post-mortem examination three quarts of blood were found in the peritoneal cavity. The tissues were blanched from loss of blood; the location of the ovum was found in the left Fallopian tube. Microscopic examination revealed a ruptured ovum at between the first and second months.

A Case of Ectopic Gestation with Operation at the Ninth Month.

Cushing (*Ibid.*) reports the case of a primipara in whose abdomen a large irregular mass could be outlined. A placental souffle could be heard but no fœtal heart-sounds. Upon laparotomy a cyst was discovered. The peritoneum was very thick and vascular, the lower portion of the sac was formed of the Fallopian tube adherent to the surrounding tissues. The upper half of the placenta was in a state of fatty degeneration, and was easily removed, the placenta tearing readily. The remaining portion was retained in the fœtal sac, but was removed without severe bleeding, and the sac stuffed with iodoform gauze. The Fallopian tube was ligated, and the abdominal cavity thoroughly washed out with hot water, and two drainage-tubes were inserted. The patient's recovery was uneventful. Examination showed that the child was between eight and nine months advanced. It had apparently died from twist of the cord near the umbilicus.

The Proteids of Milk.

Halliburton (*Journal of Physiology*, vol. ii., No. 6, p. 463) arrives at the following conclusions from an interesting study of the proteids of milk: The principal proteid called *caseinogen* is precipitated by certain neutral salts, or by acetic acid, and may be most satisfactorily prepared by combination of

these two methods. The term *casein* should be applied to the curd formed from caseinogen by the action of rennet. In the classification of proteids, casein should be grouped with other insoluble proteids like fibrin and gluten formed by ferments from more soluble albuminoids. Caseinogen should be placed in a new group including it and the proteid of whey. These bodies are similar to the globulins, the chief difference being that their solutions are not coagulated by heat. Lact-albumin resembles closely serum-albumin; it differs, however, in specific rotatory power, in its heat-coagulation and its precipitation by neutral salts. Caseinogen and lact-albumin are the only proteids contained in milk. Other proteid bodies supposed to have been isolated in milk have not existed as such. The body called *whey*, a proteid formed in rennet fermentation, should be included with caseinogen in a new class of proteids allied to the globulins.

The Causes and Treatment of Post-partum Hæmorrhage.

Schauta (*Prager medicinische Wochenschrift*, No. 53, 1893) writes of the treatment of post-partum hæmorrhage in a practical and interesting manner. In seeking for the cause of hæmorrhage, the practitioner must remember that while atony of the uterus is the most frequent cause, yet others may be present of equal importance. Such are failure of the uterine muscle properly to retract and close the mouths of the uterine sinuses; dilatation, degeneration, and atheroma of the bloodvessels of the uterus; retained portions of placenta; lacerations of the genital tract opening bloodvessels; varicose veins which have been ruptured during labor; bleeding from rupture of the uterus at the lower uterine segment; tumors, especially myomata and carcinomata, which become bruised and lacerated during labor. In the treatment of these cases it is essential that the placenta be delivered in such a manner as best to avoid uterine relaxation and hæmorrhage. Schauta wisely advises that no effort be made to express the placenta during the first half-hour following delivery; he would even adopt Ahlfeld's suggestion, and allow two or three hours to elapse before removing the placenta manually. The Credé method is preferred when expression is possible.

In the treatment of hæmorrhage caused by uterine atony, uterine massage is indicated and also hot douches; these are best given of sterilized water, or of some antiseptic solution, bichloride of mercury not being considered applicable in these cases. Ergotine may be given by hypodermic injection; the intra-uterine application of styptics is strongly condemned. The intra-uterine tampon of iodoform gauze is warmly commended, and has given none but good results in Schauta's hands. In cases where a hæmorrhage is persistent and severe, the blood coming from degenerated vessels in the site of the placenta, it may be necessary to adopt a procedure advised by Kocks. This consists in inverting the uterus as soon after the birth of the child as possible, and applying an elastic ligature about the cervix. In addition, iodoform gauze may be used as a tampon. After six hours the elastic band may be removed and the uterus replaced. When hæmorrhage results from retained portions of placenta, the thorough exploration of the uterus and the removal of such portions will promptly check the hæmorrhage. Hæmorrhage from lacerated wounds in the genital tract is best controlled by suture,

or ligature, or by a gauze tampon. In the treatment of the anæmia following hæmorrhage, the transfusion of dilute saline solutions is especially commended. Schauta describes a case where, after laparotomy, severe hæmorrhage resulted; four hours after the operation the abdomen was again opened, and large clots and fresh blood were found. The hæmorrhage was checked, and the threatening anæmia of the patient was relieved by transfusion with salines.

Polyuria during Pregnancy.

Voituriaz (*Archives de Tocologie*, No. 12, 1890) reports the case of a primipara who suffered after the fourth month of her pregnancy with polyuria. The density of the urine was 1011, no abnormal condition being discovered by chemical or microscopic examination. Labor was somewhat prolonged by reason of the size of the child, and the forceps was used. Almost immediately after labor the polyuria disappeared. The writer suggests that its origin was reflex stimulation of the action of the kidneys occasioned by distention of the uterus.

Spontaneous Delivery in a Case of Parietal Presentation in a Small Pelvis.

Chaleix (*Archives de Tocologie*, No. 11, 1890) reports the case of a primipara, aged seventeen years, with a small pelvis, antero-posterior diameter of the inlet being eight and a half centimetres, or three and a half inches. When dilatation was complete, the sagittal suture was found extending across the pelvis, the left parietal bone presenting at the pubes. As the patient's pulse, temperature, and general condition remained good, and the fœtal heart-sounds gave no indication of danger, no active interference was practised, the patient receiving warm vaginal douches of a saturated solution of boric acid. After a labor which lasted nearly forty-eight-hours, spontaneous delivery occurred. The fœtal heart-sounds were heard up to the time when the expulsion of the fœtus began, but during expulsion the child perished. On examining the fœtal head its condition was found to be as follows: The antero-posterior diameters were considerably increased and the transverse notably diminished in length. The *caput succedaneum* was found upon the left side of the cranial vault; the internal border of the left parietal bone, the anterior, was pressed strongly beneath the border of the right parietal bone; at the border of the left temporal fossa there existed a marked depression a sixth of an inch in area. At the moment of expulsion the occiput rotated beneath the pubes.

Two Cases of Incomplete Breech Presentation, with the Use of Forceps.

Porak (*Bulletins et Mémoires de la Société Obstetricale, etc.*, No. 12, 1890) reports two cases of breech presentation in which the breech remained unfolded. Delivery was effected in one by the employment of the hands, while in the other the forceps was applied to the sides of the child's body, the blades fitting over the trochanters. The latter method has been employed by Tarnier in a number of cases, and has resulted favorably in his hands. Porak concludes from a study of his cases that the forceps may be applied to

the pelvis of the fœtus, the tips of the blades extending a little beyond the crests of the ilia to advantage. The blades should be applied in the bis-trochanteric diameter, the trochanters fitting into the fenestræ.

Rigidity of the Cervix Uteri during Labor Necessitating the Application of Forceps; Laceration of the Anterior Lip.

Loviot reports (*Ibid.*) the case of a primipara, aged twenty years, with whom it was necessary to apply the forceps. The perineum and pelvic floor were uninjured, but upon the anterior lip of the cervix uteri was torn transversely a piece of the tissue, and a portion about an inch square was entirely severed. The patient made an uninterrupted recovery, the cervix healing during the puerperal state.

The Causation of Placenta Prævia.

Schrader (*Zeitschrift für Geburtshülfe*, Band 19, Heft 1) describes the case of a multipara who had had a severe labor previously, during which version and extraction were necessary. This happened some time before the present pregnancy; the cervix uteri was lacerated. In her next confinement she suffered from hæmorrhage found to be caused by a placenta prævia. This, however, was not sufficiently severe to jeopardize the life of the patient. The cause for the abnormal attachment of the placenta was found in an excessive dilatation of the lower portion of the uterus with the firm union of the placental reflexa with that of the uterus. This has already been pointed out by Kaltenbach.

GYNECOLOGY.

UNDER THE CHARGE OF

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The Electrolysis of Uterine Fibromyomata.

Zweifel (*Deutsche med. Wochenschrift*, October 2, 1890) regards this treatment as entirely symptomatic, and as such it must be acknowledged that it is superficial to any other palliative means, either medical or surgical. There is no doubt that the growth of the tumor may be arrested by galvanism, though sometimes this is noted only while the patient is under treatment; hence follows relief of certain pressure-symptoms. The hæmostatic action of the current is most striking. The writer has obtained better results with mild currents, as thirty milliampères, than with those of one to two hundred milliampères, and believes that they accomplish about the same as curetting and cauterization of the endometrium, and that the electrical treatment, though longer, is less dangerous. It must not be forgotten that proper cases

are to be selected, else valuable time may be lost in trying to relieve a patient by electricity who must eventually be brought to the operating-table, too late for the successful performance of myomotomy. The writer believes, with Apostoli, that the effect of the positive pole within the uterus is purely a local cauterization, the chlorine which is set free exerting a powerful antiseptic action.

The Technique of Operations for Vesico-vaginal Fistula.

Martin (*Proceedings International Medical Congress*, 1890) describes a case of fifteen years' standing in which the entire vesico-vaginal septum with the upper portion of the urethra was missing, the cervix uteri being deeply torn. Two unsuccessful attempts at closure were made. After rendering the urine acid and healing the extensive erosions on the external genitals, the writer undertook to close the fistula. An incision was made through the healthy vaginal mucous membrane surrounding the opening; the laceration of the cervix was then closed, and the flap of vaginal mucosa was slid over the fistula and the opposite edges united. The raw surface in the anterior vaginal wall was next covered as in an anterior colporrhaphy. In spite of the amount of cicatricial contraction, and the presence of an intense vesical catarrh, the wound healed with the exception of a small opening in the cervix, which it was easy to cure by a subsequent operation. The disposition of the flap was similar to that employed by Volkmann in the operation for ectopion vesicæ.

Electro-therapy in Gynecology.

Prochownick (*Ibid.*) has applied this treatment carefully in 110 cases, with the following results: Fourteen patients with uterine fibromyoma were treated, seven on account of hæmorrhage, which was checked with either arrest of growth or diminution in the size of the tumor; three applied on account of pain and were entirely relieved. The applications were repeated at intervals of from three to five days and were continued for two or three months. The writer believes that this treatment is absolutely free from danger so long as one practises rigid antisepsis and avoids galvano-puncture, refraining from downward traction upon the cervix. Assuming, with Martin, that 80 per cent. of all fibrous tumors are of a benignant character, perhaps one-third of these may be successfully treated with hot injections, ergot, hydrastis, etc. The remainder, especially growing tumors associated with pain and hæmorrhage, are best treated by electricity. Too few have yet been kept under observation for several years to enable us to determine if the benefit is permanent after cessation of the treatment. Apostoli himself admits that many patients have a recurrence of their symptoms after the lapse of a year, or a year and a half. The fact that some fibroids become cystic can hardly be attributed to the use of the continuous current, since this change may occur even where no treatment has been instituted. Some fibrous tumors continue to grow in spite of treatment, others are associated with malignant degeneration of the endometrium, and many become malignant or rapidly undermine the general health; in these cases there is no alternative save a radical operation.

Twenty-two cases of chronic perimetritis, associated with ovarian and tubal disease, were treated with more or less success. In twelve cases, in which a gonorrhœal history was absent, pain and hæmorrhage were the principal symptoms; eight were permanently relieved by a current of 100 to 150 milliampères (the greatest number of *séances* being fifteen), two could not bear the treatment, and in two cases it was necessary to perform laparotomy. Less favorable results were obtained in the case of the ten patients whose condition was due to gonorrhœal infection; five were entirely relieved, two somewhat, and in two fresh inflammation was set up. Of course it is not claimed that an anatomical cure takes place in cases of pyosalpinx, although the tumor sometimes appears to grow smaller, but the distressing pains, hæmorrhage, and vaginal discharge are certainly relieved, and frequently. Greater care must be used in the introduction of the sound than in cases of fibromyoma, and more attention must be paid to the after-treatment of the patient. The current used in the treatment of perimetritis should not exceed 150 milliampères. The writer did not continue the treatment longer than three months, giving two *séances* a week; his patients were made to rest for two hours after each application.

The Galvanic Current in Gynecology.

Apostoli (*Ibid.*) states the following as his present views upon the subject:

1. The principal value of the constant current is in its action in cases of fibroid tumors and endometritis, especially where pain and hæmorrhage are constant symptoms. It not only arrests the growth of benignant tumors, but promotes the absorption of peri-uterine exudations. It is absolutely contra-indicated in acute suppurative inflammation of the adnexa.

2. The galvanic current possesses a polar and an interpolar action, the latter being of a trophic and dynamic character, the former thermic and antiseptic.

3. The more powerful currents (above fifty milliampères) possess these advantages: *a.* They influence the circulation through the development of heat (*drainage circulatoire*). *b.* They are antiseptic and germicidal. *c.* Their effect increases as the square of current-strength. *d.* They can be easily employed by the general profession. *e.* The stronger the current employed the less the probability of a return of the symptoms.

4. Intra-uterine galvanization is preferable because by it the maximum effect is obtained, the antiseptic action of the positive pole is secured, direct cauterization is effected, and there is less pain than in the intra-vaginal method.

5. In proper cases galvano-puncture by means of a fine gold needle, insulated up to within one-fifth of an inch of its point, enables the operator to concentrate the action better and to produce a more powerful effect with weak currents.

6. As compared with the application of caustics and curetting, intra-uterine galvanization is far more harmless, as shown by the writer's experience, who, between July, 1882, and July, 1890, had practised the latter 11,499 times with only three fatal results—once in a case of galvano-puncture for subperitoneal fibroma, once in a case of galvano-puncture for salpingo-

oöphoritis, and once where the same treatment was employed in the case of an ovarian cyst, which was mistaken for a fibroid. In thirty instances pregnancy followed the use of intra-uterine applications.

The Results of Treatment by Apostoli's Method.

Cutter (*Ibid.*) calls attention to the fact that in 1871 he treated a case of uterine fibromyoma by galvanism, following essentially the method subsequently developed by Apostoli. In his experience he had found that the growth of the tumor was arrested in 50 per cent. of his cases, that there was slight improvement in 6 per cent., no diminution in the size of the tumor in 14 per cent., and more or less complete disappearance in 22 per cent. His mortality was 8 per cent. With the patient anæsthetized, he introduces both electrodes through the abdominal wall into the tumor and allows the current to pass for five or ten minutes, rest in bed being enjoined for several days subsequently with restricted diet, two-thirds meat and one-third vegetable; diet he regards as extremely important.

Drainage after Laparotomy.

Sänger (*Med. Anzeiger zum Centralblatt für die ges. Medicin*, August 30, 1890) reviews the literature of this subject, tracing the evolution of drainage from Koeberlé to Hegar. Drainage may be effected by glass tubes, by tamponade with absorbent gauze, or by the two combined. The writer prefers the latter method, using slightly-curved tubes with a diameter of two-fifths of an inch, having small, lateral perforations one-twenty-fifth of an inch in diameter; these are boiled and are kept in a solution of bichloride, 1 : 500. After removing the fluid from the tube, previous to applying the dressings, it is stuffed with aseptic gauze, which is not changed for twenty-four hours. No syringe is used to withdraw the fluid. The drainage-tube is removed on the third or fourth, though occasionally not until the sixth or eighth day. The writer believes that drainage acts as a "safety-ventilation," allowing the discharge of secretions which, if retained within the cavity, would serve as a nidus for septic infection.

The use of a gauze-drain alone has certain disadvantages, since the portion within the pelvic cavity soon becomes soaked and ceases to act as a capillary drain; it is then impossible to change it, since if it is drawn out the fluid is squeezed back into the cavity. Even when it is necessary to tampon on account of obstinate oozing, it is better to use a glass tube with the gauze. It is not necessary to resort to "ventro-vaginal drainage," as recommended by Martin in cases of myomectomy, since all secretion can be thoroughly removed through the abdominal drain.

Drainage should be employed under the following circumstances:

1. When there exist at the time of the operation circumscribed collections of blood or decomposed fluid, which exceed in virulence the absorptive power of the peritoneum. 2. When it is probable that there will be a subsequent secretion of fluid which may serve as a focus of infection. 3. When there has been an injury to the bladder or gut and there is a chance that their contents may escape into the cavity. 4. When it is desirable to shut off large raw surfaces from the general peritoneal cavity.

PÆDIATRICS.

UNDER THE CHARGE OF

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INVERTIN FERMENT IN THE ANIMAL ORGANISM.

According to MANFREDI (*Jahrb. f. Kinderh.*, xxxi. 1 and 2), there are various opinions, and there have been various expressions, as to the occurrence and origin of invertin ferment in the stomach and intestinal canal. It is generally admitted that such a ferment, a product of glandular secretion, exists in the intestinal canal, and by some that it also exists in the stomach. The fact that numerous bacteria possess the properties of invertin, and that this ferment has even been separated from them, makes it quite possible that it may be generated by them in the intestinal canal. The author's paper is based upon investigations upon the intestinal canal of the guinea-pig and the dog in order to determine this question. His method consisted in taking intestinal secretion, and an infusion of the intestinal mucous membrane, also a filtrate of both freed from bacteria by Chamberland's filter, and testing it quantitatively as to its invertin action upon solutions of cane sugar. The following are his conclusions:

1. The presence of numerous bacteria, which are the source of invertin in the intestinal canal, in connection with the constant presence of the ferment in the intestinal secretion, demand new investigations in regard to the digestion of cane sugar.

2. Previous investigations upon this subject are of no value, partly on account of faulty methods, and partly because commercial cane sugar always contains a small quantity of glucose.

3. The causes of the so-called spontaneous production of invertin from cane sugar and its solutions are the microörganisms which are derived from the air and may possibly be converted into invertin. Spontaneous conversion into invertin can be prevented by careful sterilization, the use of five per cent. carbolic acid solution, filtration through Chamberland's filter, and precautions against germs of all sorts.

4. Invertin is not produced in the stomach where under normal conditions there is no development of bacteria. Those opinions are erroneous which hold that invertin may be produced in the stomach by the action of the acid of the gastric juice, by the gastric mucus, or by a particular gland secretion.

5. In the intestinal juice, which normally contains many bacteria susceptible of conversion into invertin, this substance is constantly found in considerable quantity. In the guinea-pig it is exclusively due to the action of microörganisms. In the dog it probably has a similar origin.

6. In other organs, especially in the liver, the ferment is not present.

7. In solutions or mixtures made by combining portions of all the organs

of the body, the gastric mucous membrane alone being excepted, also in mixtures of all the secretions of the body, invertin may be found if the mixtures are exposed to the air long enough for the development of bacteria.

Sterilized Milk and its Use in Nourishing Children.

In an article on this subject Eisenberg states that (*Jahrb. f. Kinderh.*, xxxi. 1 and 2) a danger in the use of animal milk for the nourishment of children consists in the fact that unless it is taken by the child immediately after being drawn from the udder of the animal it will contain germs which are the result of decomposition and fermentation.

Pasteur showed that the decomposition of milk is effected by germs which exist in the air, and that these germs possess activity to a marked degree.

Hueppe showed that there were two varieties of such germs—acid-forming and lab-forming, and that perfect sterilization could easily be accomplished. Soxhlet devised an apparatus by which a given quantity of milk could be reduced to a proper consistency by boiling in a water bath for forty minutes. Hochsinger devised a plan for sterilizing milk for infants on a large scale, and it can now be obtained in the shops thus prepared. By the author's method of sterilizing milk for family use, a suitable metallic frame with places for twelve bottles is provided. These bottles being graduated in cubic centimetres, the milk may easily be reduced to the desired consistency. The bottles are provided with stoppers which seal them hermetically, and are to be boiled in a water-bath for thirty minutes. The nipple must be adjusted to the bottle immediately before it is to be used. After use the bottles should always be washed with soda, sand, and water.

The Physiology of Stomach-digestion in Infants.

Van Puteren reports the following experiments (*Jahrb. f. Kinderh.*, xxxi. 1 and 2): The contents from the stomachs of 248 healthy breast-nourished infants obtained by irrigation, were utilized in the author's investigations. Their ages varied from two to forty-one days. In all, 1027 examinations were made. A simple Jaques catheter introduced into the stomach, and lightly pressed against its wall, was used in the experiments for determining the quantity and quality of the acid- and lab-ferments of the stomach. Washings of the stomach with distilled water at 35° C. were used in determining peptonization, and the duration of digestion, and in the latter procedure a glass cock, with double bore and containing three glass tubes, was employed. The contents of the stomach were withdrawn at intervals of ten or fifteen minutes during the period of digestion. The author considered the following points:

1. Duration of ingested milk in stomach. Sixty to eighty grammes were taken by each child during the first month of life at each meal. The contents of the stomach could be easily withdrawn during an hour and a half following their ingestion. Irrigating with distilled water they could be obtained for two hours and twenty minutes, providing that not less than twenty to forty grammes were taken at a meal. This material thus obtained was not alkaline, and contained no bile, hence was from the stomach. The

quantity in the stomach diminished rapidly during the first hour, and in two hours there were not more than twenty to thirty cubic centimetres, this disappearing slowly during the next half-hour.

2. The contents of the stomach were less decidedly acid than is the case in adults. Increasing acidity was evident as digestion progressed, 741 filtrations being made. The acidity was most marked ninety-five minutes after eating.

3. Character of the acid contents of the stomach: Methyl-violet gave positive results for hydrochloric acid, and Uffelmann's reagent for lactic acid. During the first two months of life hydrochloric acid is that which is normal for the stomach.

4. Anti-fermentative power of the stomach contents: Plate cultures were made at once, and after two hours withdrawal of material withdrawn immediately after nursing and at various subsequent periods, the nutrient medium being a mixture of skimmed milk, albuminate of soda, and eight per cent. of gelatin. No perceptible difference was observed in the microörganisms obtained by the two methods.

5. The presence of lab-ferment: The tests which were used gave a negative result with infants under twenty days old; with somewhat older ones there was weak coagulation, while the influence of lab-ferment was very plain in infants of from twenty-nine to forty-one days.

6. The peptonization of albuminates: Ewald's method was accepted, according to which albumen was seldom found, and only in the course of the first hour. Peptone and syntonin were present from twenty-five minutes after eating until the end of digestion. Propeptone was found in thirteen out of fifty-three cases. Sugar and fat were always found, but as long as peptone was present in the stomach the fat could not be converted into fatty acids b the action of ether.

This method of investigation has heretofore been little used for the study of the functions of the infant stomach. Raudnitz and Leo have studied the subject in this manner—that is, by irrigation of the stomach and examination of the washings, but only to a limited extent. The author's investigations have been far more extensive, and he has given exact data in regard to the presence of hydrochloric acid. He has also been able to deny the presence of lactic acid under normal conditions. He was unable to verify Leo's statement as to the presence of lab-ferment in the infant stomach prior to the twenty-fourth day. Further studies on this subject are very desirable.

The Mechanism of Respiration in the Newborn.

In discussing this subject von Dohrn gives the following (*Jahrb. f. Kinderh.*, xxxi. 1 and 2) conclusions:

1. The breathing of newborn infants is mainly thoracic.

2. In forced respiration, the raising of the thorax begins at the upper part and extends downward.

3. The exchange of air in the newborn, in ordinary respiration, averages thirty-five cubic centimetres, and increases with forced respiration to a maximum of one hundred and twenty cubic centimetres. In the newborn the exchange of air is about a quarter of the entire volume respired, while in adults it is only about one-tenth.

4. On the first day of life the change of air is very small in volume; it increases until the third day, and then sinks a little, subsequently rising again. At the end of the first week its volume is about one-quarter greater than on the first few days.

5. The lungs are not filled with the first few respirations, as a rule, the alveoli not being well distended until about the second day.

6. The respiration-curves in the newborn show no pauses.

Diabetes Mellitus in Children.

Stern (*Arch. Ital. di Ped.*, 1890) gives the records of 117 cases of this disease in children, found by the author, of which 75 were published prior to 1876. Since many cases are never reported, it can hardly be said that the disease is a very rare one. The disease was found to be more frequent in females in the ratio of 5:3. Among adults males are more frequently attacked. Six of the 117 cases were seized during the first year of life, the others between the first and fifteenth years. Heredity was an important etiological factor, neuropathic as well as diabetic tendencies in parents predisposing to the disease. Other etiological factors were Werlhoff's disease, measles, malarial fever, cold, typhoid, and the excessive use of sugar. There may be a traumatic origin, especially if blows have been received upon the head. The quantity of urine passed may range from 1500 to 4000 grammes daily. Albumin as well as sugar may be in the urine, and there may be a trace of acetone or aceto-acetic acid. In the cases analyzed there was little elevation of temperature. With some there was anæmia, with others eczema, furuncles, abscesses, caries of the teeth, labial herpes, lingual psoriasis, and scrofula. The hearing was sometimes affected, and there were several cases of cataract. Indigestion was not infrequent, but the heart and bloodvessels were seldom affected. In a number of cases death was preceded by diabetic coma. The duration in 35 cases varied between two days and five years. In 14 cases there was complete cure, in 7 improvement, in 4 no improvement, and in 52 the result was fatal. The treatment is mainly a matter of diet. The carbonates and salicylates may be beneficial, but there is no certainty in the matter.

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